

Cryptozoology

SCIENCE & SPECULATION



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CRYPTOZOOLOGY

SCIENCE & SPECULATION

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Coachwhip Publications

Landisville, Pennsylvania

This One



YT6T-1152-5G6C

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Published by Coachwhip Publications.

Publisher's Cataloging-in-Publication Data

Arment, Chad.

Cryptozoology: science &
speculation / Chad Arment. — 1st ed.
— Landisville, Pa.: Coachwhip
Publications, 2004

p. ; cm.

Includes bibliographical
references and index.

ISBN: 1-930585-15-2 (pbk.)

1. Cryptozoology. 2. Zoology. I.

Title.

QL88.3 .A76 2004
001.944—dc22

0402

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ACKNOWLEDGMENTS

First, I thank those investigators who have gone out of their way to provide materials and discussion about mystery animals. These especially include Nick Sucik, Gary Mangiacopra, Ron Schaffner, Charles Paxton, Michael Frizzell, Loren Coleman, Brad LaGrange, Scott Norman, Karl Shuker, and Craig Heinselman.

Second, I appreciate the CZ listmembers' efforts as they continue to inform, educate, debate, and amuse.

Cryptozoology is an old path which, if often unrecognized, is not without a significant history of explorers cutting swaths through a confusing jungle of biological mysteries. Those efforts are not forgotten by this generation of investigators.

Science

CHAPTER ONE

What is Cryptozoology?

When were you first exposed to cryptozoology? Did you read a book about Bigfoot or watch a television documentary on the Loch Ness Monster? Giant primates and aquatic unknowns anchor popular interest in zoological mysteries. Moreso than the supernatural, they tug at the viscera—in part, perhaps, because the civilized world peers down on nature. A flesh and blood creature that eludes our grasp or resists comprehension challenges that precarious intellectual authority. Strange sightings commonly provoke straightforward denial—“It doesn’t exist,” or “it can’t exist.” It is unfortunate that emotion often dictates attitude, for cryptozoology is much more than mere monster hunting.

What is cryptozoology? In short, it is a targeted-search methodology for zoological discovery. Specifically, it is just one path by which the status of purported new or lost species may be resolved. Practically, it is a lengthy process of collecting and analyzing data to determine which mystery animals may be unknown biological species, and then searching for conclusive physical evidence.

These mystery animals are cryptids, or *hidden animals*. We will look at cryptid classification, but a cryptid is an *ethnoknown* animal which may represent a new species or a species previously considered extinct. The crucial element in that definition is *ethnoknown*. We know that there are millions of species that are not yet scientifically described. Most collected species will be discovered and described without any prior knowledge of those species’ existence. Ethnoknown species are those for which some prior contact with man has been communicated to others. They may have solid standing within a people’s belief system, or may have been a casual sighting scribbled into an explorer’s journal.

Professional zoologists discover new species in several ways. The most common field method is through area-specific surveys and traplines which randomly inventory the species at a given location. An ornithologist captures birds with mist nets or records birdcalls for comparison with known species. Seines collect fish for the ichthyologist or amphibians for the herpetologist. Entomologists lure moths or collect beetles from the upperstory of the rainforest. There are regions all over the world, even here in North America, where exploration and random collection proves fruitful in species discovery. If you study the habits of recognized species and how they are best collected, you can extrapolate that an ample percentage of similar species can be discovered using similar collection techniques. Varying behavioral adaptations mean that you won't collect every unknown species, but the success rate is high enough to keep zoological systematists busy.

Sometimes, a distinct species is overlooked because it resembles common fauna or belongs to a group that has not been studied closely. A biologist working with museum specimens may realize that distinctions within a group of vouchered genets or cobras require revisions in that group's taxonomy. Case in point, the parrot *Pionopsitta aurantiocephala* was originally mistaken as an immature form of the vulturine parrot, *P. vulturina* (Gaban-Lima *et al.*, 2002). Recent advances in biotechnology have sparked a veritable explosion in species descriptions. Scientists are finding that separate populations of similar organisms sometimes show genetic distinctions at a species level. When, for example, statistical analysis of Australian brushtail possum morphology displayed unusually divergent data, genetic evaluation confirmed the presence of an unrecognized species, *Trichosurus cunninghamii* (Hall 2003).

Chance encounters are instrumental in other discoveries. A bird is hit by a car, a shark is caught by a fisherman, a hunter takes an antelope—and if the right scientist is in the right place at the right time, it may reach him and turn out to be a new species. Fortuitous happenings are the grease of scientific exploration. Persistence, awareness, and a willingness to take chances create the right environment for discovery, but the event itself may depend upon someone walking into a market and saying, "You know, I caught the strangest thing..."

There is an additional method for zoological discovery. Rather than relying upon chance or random collection, a zoologist may investigate reports of an animal which suggest a species unknown to science. By focusing on one potential species rather than taking a scattershot approach, the scientist develops a specific procedure to locate and obtain physical evidence of the animal. Once accomplished, morphological and genetic examinations determine whether it is in fact a new species. This methodology is used in mainstream zoology, but its potential is seldom admitted. Because of risk to reputation, as it places one in the company of “fanatics” and “loonies,” it is rarely acknowledged as a methodology in its own right—cryptozoology.

What is Not Cryptozoology?

Popular interest in mysterious phenomena is high, creating an image problem for cryptozoology. Cryptids are often sandwiched between ghosts and UFOs within documentary-style programming, creating the perception that they are unearthly or paranormal. When asked to participate in these programs, cryptozoological investigators often regret the final product. Television producers have a poor track record with honest portrayals of cryptids like Bigfoot or lake monsters. The need for entertaining or suspenseful devices creates the false impression that cryptozoology is just about hunting monsters or any supposed creature that bumps along in the night.

Paranormal folkloric entities, whether ghosts, vampires, or lycanthropes, are not cryptozoological. Human medical conditions and psychoses, no matter how distorted, are still human, and are irrelevant to the search for unknown species. Occasionally, paranormal traits are attributed to certain cryptids. While I will discuss this later, this is usually the unfortunate consequence of poor data analysis. Most reports of paranormal/cryptozoological ties come from the 1970s and early 1980s, when a number of paranormal investigators began collecting and soliciting cryptozoological sightings. Their previous experience with paranormal phenomenon created a tunnel vision—if a characteristic could not be explained

within the boundaries of their own scientific knowledge, then it was probably paranormal. Or, if a paranormal report involved a "monster," then it must be cryptozoological. As more individuals became interested in cryptozoology, and the collective pool of biological knowledge became greater, fewer ties to the paranormal were theorized. Even today, the occasional paranormal-Bigfoot or witchcraft-lake monster connections are proposed by those with strong paranormal backgrounds. Paranormal theorizing regurgitates the same questions which experienced cryptozoological investigators have answered time and again—*e.g.*, if Bigfoot is not paranormal, why haven't we found a body? Why is there so much physical variation among reported cryptids? Why do we have reports of Bigfoot being shot without being killed? Honest inquiry leads to rational answers, which have been published repeatedly in cryptozoological texts.

Now, there are reports where the shade of paranormalism covers what may be a legitimate cryptid. The folkloric Chupacabra extends through a wide swath of Hispanic cultures. While accepted as an urban legend in general, there may be specific reports where a closer look is required. What if an unknown species is involved in a Central American chicken-slaughter? Chances are, it would be labeled Chupacabra even if it has never been previously associated with that name. Myths often create personas which have no more than a cursory likeness to reality.

What Creates a Cryptid?

Cryptid is a categorical term. There are no special innate qualities that elevate any cryptid's potential as an existing unrecognized species. There are literally hundreds of recorded cryptids, but not all will prove to be a new animal.

A cryptid is an ethnozoological entity. It is phenomenological—an interpretation of sightings and other encounters within the context of a world-view which is rarely scientific. When looking at a group of sightings gathered together under the name of a specific cryptid, we know that any one specific cryptid report may be based on a phenomenon other than a biological unknown.

The most common such phenomenon is misidentification of a known species. Domestic dogs and cats have been mistaken as black panthers. Lake monsters turn out to be sturgeon or catfish. Certainly, the shining eyes of a deer or owl have started rumors of a nocturnal Bigfoot. Misidentifications occur when environmental conditions create a visual effect (increasing size, changing color, or confusing a shape), when a known species exhibits an unusual or aberrant phenotype (changing size, color, or shape), or when an alien (non-native) species is encountered. It is not uncommon to discover reptiles, birds, and mammals from exotic animal collections wandering around in the wild—released by accident or intentionally. This is why investigators should familiarize themselves with known species from around the world. Misidentifications of inanimate objects also occur. In some cases, supposed lake monsters proved to be optical illusions created by underwater tree stumps or wave formations.

One example from an early Antarctic expedition shows how even individuals with presumed experience can misidentify an animal:

“Of birds we saw in all some twenty species, the most remarkable being the gregarious penguin. The first I saw of these birds was off the shores of the Falkland Islands, over two hundred miles from the nearest land. The vessel was making little headway through the water, the wind having fallen, and, on my coming on deck at midnight, my attention was called to ‘some small seals,’ which where [*sic*] playing round the stern of the vessel. They were swimming calmly about in the water, now immersing themselves entirely, now lifting their heads only above the water much as one sees seals doing in the evening, or on a bleak day, when they prefer to remain in the water rather than come out and lie on the ice, as they do when the sun shines brightly. What the sailors took for seals were, however, really macaroni penguins (*Eudyptes chrysolophus*), with their silky hair-like feathers looking like wet fur. The sailors

quite refused to recognize feathers in this close-fitting
fleece, black on the back and white on the breast"
(Bruce 1894).

Physical evidence can also be misinterpreted. That claim is the basis for some arguments against Yeti snowprints, where overlapping tracks from known species are speculated to create an oversized primate-like imprint. I have personally seen one alleged Bigfoot track which was nothing more than a footprint with an unusual snowmelt pattern at the toes. Ward (1997) suggested that the famed 1951 Shipton photographs of unusual tracks they found on Everest were possibly human, noting that abnormal feet with "congenital or acquired hypertrophy" and other defects may have been responsible. Ward even provided the bizarre photograph of a "bilateral varus deformity of the big toe" which created an ape-like jutting toe, though that is not seen in Shipton's photographs. While Ward's points do not answer all questions about the Shipton photographs, they should be closely examined.

An investigator must anticipate hoaxing. Most hoaxes are pranks contrived for short-term use in a specific location—like running through a neighborhood with giant feet strapped to shoes. Those may be for fun, but others are created for profit—photographs and videotape offered to publications for payment. Historical researchers run across old newspaper stories of strange beasts and wild men that were fabricated to entertain the readers and bump up circulation. Several cases have been disclosed within the cryptozoological community where a specific investigator was targeted for a prank—a neighbor dressing up in a gorilla suit, in one case. Obviously, those jests could trigger a tragedy, as fright leads to a fight-or-flight reaction, and a gun at hand may bias the decision. Rarer is the hoax aimed at the cryptozoological community at large. Most of those hoaxes are created by skeptics who mistakenly believe that cryptozoological investigators accept everything someone claims—it does not take long for defects in such stories to be exposed.

I was one of the first investigators to receive an email in 1998 claiming to be from a research group studying "Ozark Howlers," a sort of horned feline. This group had set up websites showing

historical sighting reports and alleged photographs. After receiving the email, I laughed it off, as the details were transparently absurd. Not long after, other members of the CZ discussion list reported receiving multiple emails from supposedly distinct individuals reporting these beasts. Most investigators recognized that the tales were creations, but it seemed strange that such a concerted effort was being made to foist these stories onto cryptozoology. Loren Coleman tracked down the hoaxer, a university student who had bet a small group of skeptically minded individuals that he could easily hoax the cryptozoological community. He bet wrong. Investigators must, though, be aware that online hoaxing is not difficult or uncommon.

There are three basic categories of cryptozoological hoaxes. The first involves a hoax targeting an innocent party. They are completely in the dark about the prank and will contact outside parties to investigate the incident. The second type involves the hoaxers themselves setting up fake evidence for investigators to look at, hoping the evidence will hold up under scrutiny. The third type is the easiest to create and sometimes the most difficult to discern—the hoaxer merely tells a tale, without bothering to set up a physical scene for investigation.

This last form includes newspaper hoaxes and traveler's tales. Adams (1962) pointed to the problems encountered when reading early travel literature, as many entertaining beasts were created to deceive the unwary, "as with Coreal's oversize manati, or Misson's fabricated bird, the *Erythromachus Leguati*. The Englishman Weld reported a mosquito that could bite through Washington's thickest book.... Maillet, in Egypt, reported an incredible hippopotamus and fish that looked like women, with two arms and two hands. Rusoe d'Eres, on a fantastic trip down a mythical Red River that began at Lake Superior, saw monkeys in America.... Snake stories were unlimited in number: one snake was so big that while it slept three men mistook it for a log and sat down on it; another, in order to pursue its prey more swiftly, joined its head and tail and rolled on the ground like a wheel; and at least three travelers to different parts of the world vouched for the existence of a kind of snake that when cut completely in two could rejoin the parts."

Some folkloric animals are invented to instruct or entertain, while others play spiritual roles. Some beasts explain away an event—"Some 'Thing' killed our sheep." Strange creature tales may be spread to keep people away from certain areas—illegal stills and popular berry patches, for example. It is not unusual to hear reports of strange animals on the outskirts of conflict, with hostile groups being blamed for their introduction. Many fanciful animals have no biological basis at all, or are amalgamations of several known species.

Hallucination is sometimes proposed, usually with a nudge and wink. Optical illusions are a far greater possibility than medical conditions running rampant. Investigators should determine the time of day for a given sighting, as drowsiness affects perception. It should not be too difficult to determine whether a witness is prone to a vivid imagination.

Of course, after sifting through these possibilities, there remains one additional prospect. A report may have at its root an animal that has not yet been named by science.

Categories of Cryptids

There have been a few classification schemes proposed for cryptids. Personally, I prefer a modest scheme:

- Type 1: Animals similar to known extant species but with obvious phenotypic differences (*e.g.*, spotted lions).
- Type 2: Animals similar to known extant species but disjunct geographically (*e.g.*, North American black panthers).
- Type 3: Animals similar only to known extinct species (*e.g.*, Thunderbirds).
- Type 4: Animals that appear unrelated to known extant or extinct species (*e.g.*, Steller's sea-ape).

Richard Greenwell (1985) proposed a more elaborate system which, among other points, differentiated between cryptids similar

to historically extinct and geologically extinct species. That could be useful in some studies. He also distinguished between cases of supposed extant taxa where some limited organic evidence was or was not available. Greenwell pointed out two categories which were of interest to cryptozoology, but were not cryptozoological in and of themselves—individual aberrant animals of known species, and zoological discoveries which had no prior ethnoknown status.

Serious discussions of cryptids agree that they must be ethnoknown. This is the foundation for cryptozoological investigation. As Greenwell (1985) stated, "What makes cryptozoology different is that it investigates certain supportive evidences of the existence of supposed animal species prior to those species being collected, fully documented, and /or described scientifically. Such evidences may be 1) indirect, in the form of archaeological relicts, art work, old manuscripts, or oral traditions or legends; or 2) direct, in the form of verbal or written reports of observations of supposedly undescribed animals, from either local native peoples of an area, or from outside travelers or explorers who visit it."

There is one further corollary to which Greenwell noted that the International Society of Cryptozoology (now, unfortunately, defunct) subscribed: "After much discussion, the Board concluded that cryptozoology should be concerned with 'animals of unexpected form or size, or unexpected occurrence in time or space.'" This is one area where I personally disagree. In order for cryptozoology to advance as a scientific methodology, we must move from subjective values to objective ones. *Unexpected* is a character which cannot be reliably measured. What is unexpected for one zoologist or investigator may be predicted by another. Personal opinion is not a valid objective tool. I suspect that this was an attempt to control the size problem in cryptozoology. We know that there are literally thousands of small species still waiting to be described due to a limited number of professional systematists. Are those species cryptids until they actually reach the head of the line and are finally described? Most small species do not qualify for ethnoknown status because they are not perceived as distinctive. Many distinguishing characters are microscopic or require specialized training to identify them. The recognition of those characters is part of the descriptive process. So, specimens which are available

and waiting to be evaluated move from *unrecognized* to *described* without enjoying cryptid status, no matter how long the process takes. This allows us to clear the field of vertebrate bias and still focus on true ethnoknowns. If an investigator comes across reports of an unrecognized invertebrate, and consultation with invertebrate biologists and appropriate scientific texts reveal no possible identification, we may then have a legitimate invertebrate cryptid, regardless of its size.

CHAPTER TWO

A Scientific Foundation for an Investigative Methodology

In science, as Poincaré (1970) pointed out, "It is knowledge which is the end, and the action which is the means." Science is methodology, but before we can effectively discuss and evaluate cryptozoology as a scientific methodology, we need to understand the underlying principles of discovery in science. Condensing such a broad array of pertinent topics into a single chapter has obvious drawbacks, but this will at least provide a foundation for further discussion.

On Terminology

A precise terminology and coherent organization are crucial for a proper methodology. Because science strives to be objective, our terminology must be consistent and clear in meaning at all times. Hempel (1965) stated that a scientific vocabulary describes things and events under investigation, as well as allowing us to form general explanatory or predictive laws and theories about those events. Hempel observed that, in the normal progression of any scientific discipline, we begin with a "natural history" phase, where we describe what we are studying and make "simple empirical generalizations" about the subject. As the discipline develops, it grows more theoretical to become more encompassing in nature. Cryptozoology, as an investigative methodology, is part of the natural history stage of Zoology proper; yet, we are beginning to see theoretical (statistical) studies even within cryptozoology itself. In order for communication among researchers to be effective, we need to seek standard terms to express both

physical and abstract concepts. "Science seeks always to measure and record phenomena" (Bunge 1959), and it is important that we do so in a manner that allows others to accurately evaluate and understand our methods and results.

First, we will start with the difference between a definition and an explanation. For the former, Popper (1962) provided the essentialist meaning, that "a definition is a statement of the inherent essence or nature of a thing." This *statement* consists of both a genus and a distinguishing character. The *genus* is a general category which may include other things, while the differentiation that pinpoints the essence is created by the *distinguishing character*. A brief definition of the word *cryptid* could be "an ethnoknown animal for which concrete evidence does not yet exist." The genus of this definition is *animal*, which includes all manner of physical creatures, and linguistically includes imaginary beasts. There are two pertinent distinguishing characters here—the first is *ethnoknown*, which refers to someone, somewhere, having knowledge of it; the second is its *unproven existence*.

There are, of course, numerous categories of definitions. An *operational definition* is one where objective criteria determine whether the term applies for a given case (Hempel 1965). To determine whether the term *cryptid* applies to a particular creature, we see two criteria which must be met: is there knowledge (however imperfect) of the animal's possible existence; is there not yet enough evidence to prove that existence? Bigfoot is a cryptid, as it meets both criteria. A barn owl meets the first criteria, but not the second.

Bunge (1959) noted that scientific concepts can also be given *contextual definitions*, by how they work in a given theory. Any reported sighting or physical evidence of Bigfoot is itself contextually defined. Whether the reported animal shows or does not show specific characters [height, hairiness, bipedality, footprint characteristics, etc.] determines whether an investigator chooses to define that event or evidence as Bigfoot-related. One investigator's "Bigfoot evidence" may be considered bunk by another investigator's definition. Likewise, one investigator will lump disparate reports together, while another will distinguish them, based on each investigator's contextual definition. This is why

it is important that investigators clearly identify their defining characteristics.

Definitions are useful because they allow us to communicate accurately with other investigators; they provide the foundation for theoretical research; they allow us to categorize phenomena in a rational manner. They do not, however, "add to our knowledge of facts" (Popper 1962). A definition merely communicates a concept of which we already have some awareness, however vague.

An explanation, on the other hand, does expand our knowledge. Salmon (1984) noted two kinds of explanations—those that allow us to manipulate or predict data, and those that expand our scientific knowledge. An explanation separates into two parts. The *explanandum* pinpoints an anomaly in need of an explanation on the basis of existing scientific knowledge, while the *explanans* are the facts which account for the phenomenon (Humphreys 1968). These facts objectively describe the events and processes which constitute and govern cause and effect (Salmon 1984). Incorporated within the explanans are general laws and antecedent conditions deductively linked to the explanandum. The explanandum must logically follow from the entire set of factual statements in the explanans (Humphreys 1968)—if any of the necessary statements are missing or wrong, the explanandum is forfeit, rendering the explanation useless.

It is crucial to distinguish between *an* explanation and *the* explanation. A given phenomenon has only one true explanation, even if more than one explanation could account for it. An investigator must be careful not to conclude that a group of relevant facts necessarily embodies *all* of the features of that phenomenon (Salmon 1984). Context must also be taken into account. Sometimes we never discover all the facts, which means we never have a good explanation.

From a scientific standpoint, an explanation allows us to see how events "fit into the causal structure of the world" (Salmon 1984). We must remember, however, that not every event requires an explanation. As Humphreys (1968) noted, "In scientific contexts, at least, it is always reasonable to ask for justification of an explanation request." What one individual regards as an anomaly may be shown to be nothing of the sort, which refutes the need for an

explanation. Improbability, for example, is not an anomaly. Humphreys observed that “getting 10 straight deuces at dice is highly improbable. But it is not anomalous—unless one holds the (mistaken) belief that highly improbable events never occur. No special explanation of the 10 deuces is required so long as we understand that such a run is not ruled out by the probabilistic theory of dice games.” The shark attacks of 2001 serve as an example: when asked to explain why the number of attacks were so high, biologists showed that there was, in fact, no significant increase in shark attacks during 2001. It was an illusion created by increased media exposure. Thus, no specific explanation was required. Likewise, many situations may not have a simple explanation, and we are under no obligation to dilute a complex answer for those who seek ten-second sound-bites.

On Classification and Taxonomy

Classification and taxonomy are often confused. A class consists of any group of things with at least one common attribute, while a taxon is a group of things sharing the same innate nature, or essence, whether or not it is physically apparent (Harré 1970). Science classifies using taxa rather than classes, which, as Harré noted, means we seek to understand the causal mechanisms connected to the natural essence and as such manifest themselves in non-arbitrary qualities and characteristics. Any given thing can be placed into a multitude of classes. A vampire bat can be a flying thing, or a furry thing, or a nocturnal thing, or a sanguivorous thing. Its essence, however, belongs to one taxon: Animal—Mammal—Chiroptera. We strive to find the essence of a thing, because “classification by manifest characters, if that is supposed to be the end of the matter, will not yield distinctions of natural kinds, only arbitrarily reclassifiable classes” (Harré 1970).

In those areas where a taxonomic system cannot be created because the nominal essence cannot be determined, a classification scheme may be necessary for preliminary organization. In other cases, characteristics within a taxon may themselves need to be classified. Classification is primarily yes/no or either/or, so that

the object in question either proves to be in or outside the class depending upon specified characteristics (Hempel 1965). This is not always useful, however, as some characteristics of interest appear in gradations rather than just being present or not. In that case, a typological or ordering system will recognize subtle variations, and allow quantitative analysis.

On Scientific Knowledge

As scientific knowledge is our aim, we ought to know something about it. Bunge (1959) noted that science is artificial, a "growing body of ideas . . . which may be characterised as rational, systematic, exact, verifiable, and therefore fallible knowledge." We attempt to understand the world with concepts and ideas. These are tentative—scientific research continually produces new ideas which support, reject, or replace old ideas.

Salmon (1984) noted that the two forms of scientific knowledge—what things are and how things behave—describe or enlighten. We develop taxonomic structures for scientific descriptions, and explanatory theories for behavioral concepts (Harré 1970).

Scientific knowledge begins with "first-person, here-and-now" perceptions (Watkins 1984), and is organized into higher levels of theoretical knowledge through further observation and experimentation. As knowledge of observable entities expands, it can then be used to theorize about unobserved phenomena. Cryptozoology begins with first-person observations, but investigations must evaluate sightings cautiously and carefully. Theoretical speculation must be grounded on facts, not beliefs.

On Facts

A factual science starts, obviously, with facts. As Bunge (1959) noted, "science begins by establishing the facts; this requires impersonal curiosity, distrust of prevailing opinion, and sensitivity to newness." Facts are those "features of the physical world that exist objectively whether or not we endeavor to explain

them" (Salmon 1984). Our treatment of different facts must also be objective. While the substance of separate facts differ, the logic of explaining each individual fact is the same (Humphreys 1968).

But a science cannot rest on known facts. Science, in its pursuit of knowledge, must go beyond known facts, even beyond facts themselves. "The chemist is not interested in this or that fire, but in the process of combustion in general; he tries to disclose that which all singulars share" (Bunge 1959).

First, we must recognize the limitation of known facts. The facts on hand do not necessarily provide us with complete details about a given phenomenon (Salmon 1984). Facts themselves are never cemented into a scientific repository—they may be discarded or replaced, as new facts are found. This provides one significant distinction between science and common sense, as common sense limits itself to the observed facts from which it arises. Science moves beyond observed facts. It discards random or irrelevant facts, then uses selected facts in controlled experimentation and investigation to unearth new facts or reproduce old ones (Bunge 1959).

Science does not gather facts as one might collect stamps or coins. Facts must be used. By theorizing and conjecturing what create facts, and testing those theories through observation or experimentation, science gains new knowledge. Understanding a process, being able to employ that process, discovering new facts, and predicting consequences of a process all take place by application of theory to facts.

On Anomalies

An anomaly is "anomalous with respect to existing knowledge at a particular time" (Humphreys 1968), and as our knowledge is often imperfect, any fact might be construed as an anomaly. Popper (1962) suggested that problems, not just observations, give rise to science. Observations certainly generate problems, especially if they disagree with scientific theories, but Popper submitted that science is best viewed as advancing from simple problems to more complex problems.

Many of our basic environmental conditions (light and gravity, for example) are distinctly anomalous. In the biological sciences, we see thousands of anomalies that are investigated by professional scientists. It is by testing those anomalies, through the application of what we currently know, that we gain knowledge. Science does not advance by resting on its laurels. It tests, it theorizes, it explores, it discovers.

Of course, scientists themselves (their personal interests and biases) determine which anomalies are actually investigated. Daston (2000) noted that the emerging natural philosophers of the Enlightenment "did not so much explain preternatural phenomena as ignore them" and that an "ethos of utility replaced the old one of curiosity, requiring that phenomena be replicable without respect to the contingencies of local conditions." To be certain, there were opening fields of study in electricity, magnetism, and other physical phenomena which took up much of their time, but they did ignore such anomalies as meteor showers. Today, that utilitarian approach continues, as science explores those areas which have a greater chance of commercial application or which are in a better position to receive research grants. Fads play their role in science, just as they do in the rest of the world.

On Theories

In order to be useful, facts, and the ideas sparked from those facts, cannot be piled up randomly or simply listed, but rather should be organized into theoretic systems (Bunge 1959). Harré (1970) described a theory as the structural representation of specific events and how those events originate. He noted that we also add conditional statements which allow for possible changes in the structure so that we can determine the structure's ability to produce changes when certain conditions are met. Because there is an inherent uncertainty with explanations and postulations within theories, Harré pointed to two distinct forms of evidence which we use to judge theories: evidence gained from theoretical predictions, successful or not, and evidence suggested by the theory's innate plausibility.

In order to be scientifically useful, a theory cannot just be set out for public display. It must be tested. If an idea is untestable, it holds little scientific merit. By testing a theory, we scrutinize the proposed mechanisms and explanations to determine whether they are correct or not, or whether the underlying assumptions need to be refocused. As Harré (1970) noted, theories do not necessarily end up being shown true or false. Further questions may be brought to light which require attention before a theory can be adequately addressed, or additional conditions may need to be examined for pertinence to the theory.

Popper (1962), of course, is well known for his criterion for a scientific theory: whether it can be falsified or refuted. He noted that confirmations or verifications can almost always be found for a given theory, if one has the imagination for it, and that therefore they should be limited to those confirmations which are the result of genuine testing ("this means that it can be presented as a serious but unsuccessful attempt to falsify the theory"). Popper preferred theories with high content, and thus, a lower probability of being true. A "risky prediction" which is confirmed would be more informative than one that is less risky. When a falsification occurs, Popper argued, *ad hoc* assumptions used to prop up the theory lowers its scientific status.

Determining whether a theory or hypothesis has merit is subjective, but Harris (1981) stated that some properties suggest plausibility: conservatism, generality, simplicity, refutability, and modesty. Harris observed that science does not progress with clean and absolute agreement. Every new hypothesis has critics and proponents. When hypotheses compete, each draws scientists willing to examine it.

Previous knowledge can also be key to determining the merit of a hypothesis:

"A scientist seeking to assess whether a hypothesis is plausible first explores it in his head. Each scientist has his own mental store of facts, theories, and associations, and a private set of value judgments about the relative importance of the different elements in that mental store. He assesses the plausibility of

a hypothesis by testing its predictions, as far as he can, against the constraints imposed by the private world of his imagination. Because this private world is necessarily an incomplete and imperfect representation of the real world and because the constraints imposed by the imagination are less stringent than those imposed by reality, individual scientists may come to very different conclusions about the plausibility of the same hypothesis. Yet we see that, in choosing their hypotheses, some scientists are consistently more fortunate than most of their colleagues. This is not, of course, a matter of luck, but a reflection of the fact that the imaginary worlds in which such scientists probe their hypotheses bear a closer relationship to reality than the imaginary worlds of their less fortunate colleagues. Scientists with a 'flair' for picking the right hypothesis simply have a more profound grasp of their subject" (Harris 1981).

On Errors

Scientific error is not uncommon. Harris (1981) regarded science as trial and error. There is no innate character in a hypothesis that shows whether it is true or false. Scientists have to test a hypothesis' predictions in the real world to make that determination. By eliminating what isn't, we learn a little more about what is.

Medawar (1969) stated that while exposing and eliminating error does not, in and of itself, advance science, it does remove obstacles from scientific progress. Correcting these errors is just as important as making none, and we shouldn't allow the possibility of error to hinder trying new things, so long as we are vigilant in detecting and righting errors (Bunge 1959).

Popper's (1962) answer to detecting and eliminating error was "by criticizing the theories or guesses of others and—if we can train ourselves to do so—by criticizing our own theories or

guesses," otherwise known as critical rationalism. An investigator must learn self-criticism when venturing into the unknown. Learning to detect error takes time and practice, but is necessary before a given theory can rise above simple speculation. Detecting error is never 100% certain, but there are characteristics which attest to problems—inconsistent, obscure, or confusing statements are often the hallmark of errors (Popper 1962).

The benefit of trial and error in science is not solely the removal of falsehood. Even a mistaken theory or hypothesis can generate important discoveries or new avenues to pursue (Harris 1981). This requires, obviously, the ability to understand the assumptions behind errors and how those assumptions will require revision or reinterpretation in the light of new discoveries.

On Chance

Chance is, at its crudest definition, the result of randomness. For our purposes, it will suffice to say that chance alone is not sufficient for zoological discovery. Opportunity must be matched by motivation to act and ability to achieve. More importantly, opportunity must arise in full sight of knowledge. There must be an awareness that the event (encountering physical evidence, for example) is itself an anomaly, and that certain steps must be taken to confirm and present that anomaly to the proper authorities.

Statistics can sometimes be used to estimate the probability of certain events' occurrences, or even the outcome of a particular event. This relies on specific assumptions which need to be fully recognized before being used to justify a hypotheses. In any case, be very cautious of statements suggesting that, for example, if a particular species actually exists we should already have proof for one reason or another. More often than not, these are based on opinion and poorly conceived calculations rather than a correct understanding of probability.

On Belief

Everyone believes. Scientists believe. Investigators believe. Skeptics believe. Beliefs are opinions (Humphreys 1968), and everybody has them. Specifically, opinions are “linguistically infected, relatively sophisticated cognitive states—roughly, states of betting on the truth of a particular, formulated sentence” (Dennett 1981).

Polanyi (1958) denoted four distinct belief states for any given statement, designated as [p].

- I believe [p]
- I disbelieve [p] (known as a *contradictory doubt*)
- I believe [p] is not proven (known as an *agnostic doubt*)
- I believe [p] cannot be proven

Belief and disbelief are two sides of the same coin. As Polanyi noted, “The doubting of any explicit statement merely implies an attempt to deny the belief expressed by the statement, in favour of other beliefs which are not doubted for the time being.” Disbelief is no better an operating assumption at determining whether a belief is true. It will just accept evidence against the belief being denied, and reject opposing evidence. Both agendas, belief and disbelief, carry a high risk of gullibility, overlooking valid alternatives, and reliance upon invalid, irrelevant, or insubstantial authorities.

An investigative methodology does not require an operational assumption of either belief or disbelief. Again, Polanyi (1958) pointed out that “there exists, accordingly, no valid heuristic maxim in natural science which would recommend either belief or doubt as a path to discovery. Some discoveries are prompted by the conviction that something is fundamentally lacking in the existing framework of science, others by the opposite feeling that there is far more implied in it than has yet been realized. The first conviction may be regarded as more sceptical than the second, but it is precisely the first which is more likely to be hampered by doubt—owing to excessive adherence to the existing orthodoxy of science.”

Can we remove belief from our investigative methodology? I have seen cryptozoological writers imply that belief and disbelief are polar opposites, representing absolute philosophical statements. In other words, when we believe something, we believe it 100%, and when we disbelieve something, we disbelieve it 100%. Their argument goes that we as human beings are incapable of having enough information to sufficiently make such absolute statements, and therefore we should not believe or disbelieve anything. This, of course, while being a fun exercise in philosophical pedantry, is irrelevant to the human condition. Whether or not we should believe or disbelieve anything is not the question—it is whether we will or not, and that, of course, is a given. The argument does not hold up because belief and disbelief are not absolute statements. Human beings are constantly bombarded with environmental and intellectual information. We process this information into our personal belief systems because we don't hold to absolutes in most cases. Our belief systems, as noted by Dennett (1981), are "states of betting," with the probability of a given statement differing between individuals due to background, experience, and other factors. New information may at any time support or detract from a certain belief, even if, overall, it remains in the same "I believe" or "I disbelieve" camp. Other cultures share this fluid nature of belief, as noted by one ethnozoologist when he pointed out the pragmatism of the Karam people (Bulmer 1968). Tribal members change or moderate their beliefs as their observation of the world around them dictates. Traditions and interpersonal discussions are always considered first in light of personal experience.

While we cannot remove ourselves completely from the realm of beliefs, it is important that we try to mitigate the problems that arise with belief-motivated investigations. Can we suspend both belief and disbelief? Holton (1981) described one research scenario: "Like the trapper in Indian country, he was advancing on dangerous territory, but with a framework of beliefs and assumptions within which judgments are possible. The chief gain was the avoidance of costly interruptions and delays that would have been required to pin down the exact causes of discrepant observations. Obviously, this is not a method we recommend to our beginning students. But obviously also, any discussion of the advance of

science that does not recognize the role of the suspension of disbelief at crucial points is not true to the activity." Suspension of belief, Polanyi (1958) wrote, is the acknowledgment that certain positive results would be accepted as proof.

How do we balance the suspension of both belief and disbelief? Investigation within Polanyi's agnostic state of "I believe [p] has not been proven" is the best path. It allows for possibilities on either side, while recognizing that there is still work to be done. Those who hold to a philosophy of disbelief, for example, have no intellectual impetus to investigate anything, which impedes scientific progress. Error may occur within an investigation, but activity breeds potential, and the possibility of error is preferable to stagnation. We can search for and eliminate error. Stagnation is fruitless.

On Scepticism

We often see the term skepticism bandied about by individuals who are, in their opinion, ridding the world of gullibility and unscientific thinking. Skepticism in its current incarnation as an elitist cultural lifestyle should be distinguished from scepticism as discussed in the philosophy of science. (In order to speak clearly about each form, I will use the noted spelling differences.)

Scepticism is the attempt by scientists and philosophers to determine what exactly we can objectively know within a naturalistic framework, and how we can know it. Several schools of thought (Watkins 1984) are rather extreme—"there is but one thing one can know, namely that one can know nothing else" (Academic scepticism); "one cannot even know that" (Pyrrhonian scepticism); "even logic and mathematics are dubious" (Cartesian scepticism). Watkins outlines the more practical Humean scepticism, which allows self-knowledge and logical truths which are derived deductively from perceptual experience. It denies any *a priori* truths about the universe. A great number of philosophical strategies are used to modify Humean scepticism, some more successfully than others. Some claim that inferences need not be deductive to be valid; some claim that there are recognized *a priori* universal

truths [e.g., the Law of Causality]; some claim that knowledge is conjectural rather than perceptual; some claim that in light of our inability to know everything, we should be pragmatic and just conduct our investigations as rationally as we can. Where does this leave us? Bertrand Russell stated, "Scepticism, while logically impeccable, is psychologically impossible, and there is an element of frivolous insincerity in any philosophy which pretends to accept it" (Watkins 1984). Still, that should not prevent us from critical study.

Skepticism, in contrast, is a belief-driven philosophy creating the illusion of scientific neutrality while adopting practices of disbelief. Skepticism is not a half-way point between belief and disbelief. Honesty requires us to discern our own motives in adopting a particular belief state. If one adopts Polanyi's state of "I believe [p] has not been proven," one can objectively search without demanding that oneself or others accept either frivolous claims or illogical debunking. One would think that modern skeptics would adopt such a practice; in truth, a few have. I was reminded by a fellow investigator that there are both *dry* and *wet* skeptics. The latter will take the time to investigate, while the former just state, "Life is too short, so why waste time investigating what usually turns out to be nonsense." Well, apparently some dry skeptics have enough free time to waste yapping about a subject they barely grasp. If a skeptic is compelled to opine on cryptozoology, that individual's statements should undergo critical analysis to demonstrate the underlying bias. (See Chapter 8.)

In many cases regarding cryptozoology, the self-styled skeptics clearly practice belief states of "I disbelieve [p]" or "I believe [p] cannot be proven," while providing little justification for such. Polanyi (1958) nicely stated, "But other doubts, which we now sustain as reasonable on the grounds of our own scientific world view, have once more only our beliefs in this view to warrant them. Some of these doubts may turn out one day to have been as wanton, as bigoted and dogmatic as those of which we have now been cured."

Given the illogical and inadequate justification for many skeptical approaches, I cannot refer to the belief-state of "I believe [p] has not been proven" as skepticism. I prefer to call it the "Investigative" strategy, and note that this is much closer to the practical

methods of inquiry and debate found among serious investigators. This strategy relies upon both critical rationalism and a stimulus to investigate.

On Simplicity

Science struggles between the desire for simplicity and the complexity of most physical systems. Most scientists recognize that simplicity (parsimoniousness) is not itself a measure of truth (Wikander 1980), but they do strive to understand processes and phenomena without undue complications. As Watkins (1984) stated, "Simplicity must serve as a principle of selection in science if science is not to become impossible. And progress in science increasingly suggests that such a principle is untenable!"

We occasionally see Ockham's Razor (also spelled Occam's) used to disparage cryptozoological reports. William of Ockham's original suggestion was "*Pluralitas non est ponenda sine necessitate*," or "Plurality must not be posited without necessity" (Jefferys and Berger 1992). This principle is used effectively when its limitations are understood. It should never be used to determine an individual theory's effectiveness. We have experimentation and observation to do that. Rather, it is used when there are two or more competing hypotheses which have the same predictions but cannot be winnowed with the data at hand. This principle suggests that we look most closely at the simpler of the hypotheses.

One benefit to a simpler hypothesis is that it could be easier to falsify, and thus discarded if necessary. Complicated hypotheses may be more difficult to test, or have more factors which must be taken into account. The biggest problem with simplicity is that it is not always easy to determine the simpler hypothesis. Which is simpler, an unknown primate in North America, or centuries of hoaxes and misidentifications which posit technical savvy and ingenuity far beyond what was then known for some pieces of evidence? (To put it another way, if it walks like a duck, and quacks like a duck, is it really simpler to hypothesize a parrot in a duck costume?) Neither is simple, and each would require far more justification than a mere statement of "that's the way it is."

Complexity in theories can be useful, as well. A productive complex experiment may suggest alternative experiments (Hoffmann *et al* 1997). There is also value in pursuing multiple lines of investigation, rather than focusing on one hypothesis in a single-minded fashion.

So long as the limits of Ockham's Razor are recognized, it can serve a useful purpose in scientific investigations. We need to understand that it is not, however, an argument against discovery itself. "From the discovery of fire down to that of the neutrino, the hypothesis that all the kinds of entities that exist have already been discovered has been refuted again and again: the ontological variety of the world has repeatedly turned out to be greater than the evidence had previously suggested" (Watkins 1984).

On Scientific Predictions

One way to test a theory or hypothesis is to predict results and then evaluate what actually happens. Science looks ahead, and must rely on known facts and past experiences to try to understand how the future will appear. It is not guesswork or prophecy, though, as predictions are based on scientific laws and verifiable pertinent data (Bunge 1959).

Determining which assumptions to include before making a prediction is important, for our expectations are based primarily on known mechanisms (Harré 1970). Bunge (1959) noted that failure in predictions is often due to faulty basic assumptions about the subject.

One problem often found in cryptozoological writings is that constraints made on whether a purported animal could or could not exist are based on speculation drawn from fossils or similarities to other organisms. As Harré (1970) stated, "To demand physical possibility would force hypothetical guesses as to the nature of things and processes to be conservatively restricted to the laws of nature already known to us." Given that we are constantly learning more about anatomy and physiology, and discovering working examples of characteristics previously thought improbable, it is poor scholarship to restrict prediction solely within

what is currently considered feasible. This is not advocacy for "anything goes," but rather illumination of philosophical restraints masquerading as biological impossibilities.

Predictions should be testable, however. As Popper (1962) noted, "it is a soothsayer's trick to predict things so vaguely that the predictions can hardly fail: that they become irrefutable." Endless speculation on what species may be responsible for a given cryptid is of little value unless there is sufficient means to determine whether or not the hypothesis is correct.

It has been suggested that a scientific explanation should have predictive power (Humphreys 1968). This idea, however, does not appear to be valid, as Harré (1970) observed that "at the heart of the attempt to reduce explanation to deduction lies the dangerous myth that somehow the course of nature parallels a logical progression from premises to conclusions." Harré provided an example: "Since prediction, except in the trivial sense of expecting what has happened once to happen again under exactly the same conditions, is very rare in science, and explanation very common, a great deal of what counts as explanatory theory, indeed explanatory sciences such as chemistry, biology, geology and so on have to be abandoned. The melancholy fact that 'predictions' of oil deposits from geological data are but rarely successful does not prevent the explanation by geological facts of why the oil deposits are where they are from being an explanation. The point is very simple. Even if the geological conditions are right, whether there is or is not oil there is a matter of contingent fact that has to be ascertained by boring, and nothing but the discovery of the presence of the oil is sufficient to predict its being discovered by some logical means." I won't debate that the petroleum industry has probably advanced in their prediction techniques in the last few decades, but the point holds fast. Predictive symmetry is often a theoretical, rather than practical, exercise.

On Strategies

Strategies (in this context) are the means by which we approach a scientific problem and attempt to gain information about it.

Medawar (1969) noted scientific intuition follows several paths:

Deductive approach: Seeing at once what follows from holding certain views.

Inductive approach: Thinking of a hypothesis from which what we wish to explain will follow logically.

Analogous approach: Seeing real or apparent structural similarities between two or more ideas.

Experimental approach: Thinking up an experiment which provides a searching test of a hypothesis.

Dennett's (1981) Intentional Strategy suggests, "First you decide to treat the object whose behavior is to be predicted as a rational agent; then you figure out what beliefs that agent ought to have, given its place in the world and its purpose. Then you figure out what desires it ought to have, on the same considerations, and finally you predict that this rational agent will act to further its goals in the light of those beliefs. A little practical reasoning from the chosen set of beliefs and desires will in many—but not all—instances yield a decision about what the agent ought to do; that is what you predict the agent will do." Dennett noted that this strategy can, in fact, be useful in working with animals: "Our use of the intentional strategy is so habitual and effortless that the role it plays in shaping our expectations about people is easily overlooked. The strategy also works on most other mammals most of the time. For instance, you can use it to design better traps to catch those mammals, by reasoning about what the creature knows or believes about various things, what it prefers, what it wants to avoid." I would suggest that this strategy can be adapted to any number of organisms, rather than just mammals.

Without going into the debate over deductivism versus inductivism (*i.e.*, Popper's (1962) "induction . . . is a myth" versus Harré's (1970) "in actual science, deductive systems are quite rare"), it can safely be said that scientists utilize a variety of strategies. Bunge (1959) noted that "every scientific pursuit . . . is both deductive and inductive," as we include both "demonstrative" and "inconclusive" inferences. These additional strategies could uncover alternatives and options not previously recognized, while still

holding to a structured investigative approach. What is most important is to understand the limitations of certain strategies—that conclusions based on one strategy may not be as solid as those based on another.

An investigation should be planned, not erratic. The gist for each investigation is the same: an investigator should know what they are after and how to find it. Bunge (1959) pointed out that scientific methodology “does not provide infallible recipes for the finding of truth: it just contains a set of fallible (improvable) prescriptions for the planning of observations and experiments, for the interpretation of their results, and for the very posing of questions. It is, in short, the way science inquires into the unknown.”

When an anomaly is recognized, we seek to obtain pertinent objective facts about it. Where do we get information, and how do we know that it is correct? Eyewitnesses certainly cannot be relied upon 100%; historical accounts may be hoaxes or sanitized; experimentation may be flawed; even expert authorities may be wrong. Acknowledging this, and allowing ourselves to be open to critical examination, is key to scientific progress. “Every source, every suggestion, is welcome; and every source, every suggestion, is open to critical examination” (Popper 1962). Popper noted that we have many tools in rational analysis: observation, reason, intuition, imagination. We have no excuse not to examine information and results with both an open mind and a critical eye.

With such data, a hypothesis or theory can be formed for the mechanisms behind the anomaly and the means by which it expresses itself. Not all hypotheses will be clear-cut. Decisive predictions are uncommon, and open-ended hypotheses may be necessary until they can be improved. Useful data can emerge from imperfect hypotheses.

CHAPTER THREE

A Logical Foundation for an Investigative Methodology

We have looked at the factual sciences, which theorize to advance, so let's examine the formal science of logic. First, logic is not equivalent to the factual sciences. Logic concerns itself with ideas, not facts. While rational and verifiable, logic is not objective (Bunge 1959). So, while we must be logical within the factual sciences, logic itself is not sufficient to verify that a fact is true. Observation and experimentation must provide empirical data which is logically arranged to support the truth of a given fact.

A good theory, of course, is logically consistent. While logic cannot guarantee that a theory will be true, it does ferret out errors in assumptions and methodology. The best way to begin is to study logical fallacies and how to avoid them. An argument or theory should be examined carefully to make certain it does not include fallacious reasoning.

We will look at the logical fallacies most likely to appear in arguments regarding cryptozoology. There are several classification schemes for logical fallacies, but here we will examine fallacies individually. Two interesting arrangements can be found online, created by Downes (1995-2003) and Curtis (2001-2003).

Churchill (1990) noted three conditions necessary to justify a conclusion in a given argument:

- 1) The premises and conclusion must be consistent and cannot contradict each other.
- 2) Support for the premises must be independent of the conclusion itself; there must be logical distance.
- 3) The premises must be sufficient to support the conclusion.

Specific strategies (deductivism or inductivism) require serious examination for typical fallacies. Poor deduction may lead to formal fallacies due to invalid structural forms. Informal fallacies are often the result of shoddy induction. When examining premises and consequences, investigators must especially take care not to commit the Fallacist's fallacy—just because a particular argument is shown to be fallacious does not mean that the conclusion of that argument must be false. Another argument, properly structured, may legitimately support that conclusion.

Formal fallacies

Formal fallacies are those arguments which have invalid logical forms and misapply a principle of logic. Unconnected premises, for example, might be used to create invalid conclusions. ("All sightings of that mystery ape come from one region of the Congo, and we know that large chimpanzees are found in that region of the Congo, so all those sightings of that mystery ape must be based on large chimpanzees.") This requires study of truth functions, syllogisms, and Venn diagrams, which can be found in logic textbooks.

Formal probability fallacies

Similar to formal fallacies are the problems encountered with estimating probabilities.

"We've been trapping small mammals in the Pacific Northwest for several years. We haven't caught a Bigfoot, so it's unlikely they exist."

The probability fallacy of unequal chances renders all possibilities equal in chance by ignoring variable factors. If we rely on a technique targeting small mammals, the odds of large mammals being captured are greatly decreased. Examine your argument to see whether certain outcomes are favored over others.

Inconsistencies

Inconsistencies may be obvious within an argument, but many times it is necessary to examine the consequences for contradictory statements. When faced with contradictory statements, we know that both cannot be true even if the false statement is not immediately obvious.

“Some cryptids have only been reported once or twice, so they should not be considered of interest to cryptozoology.”

Cryptozoology is the investigation of purported animal species which are undescribed by traditional zoology because their alleged existence is supported by insufficient anecdotal or physical evidence. To conclude that a particular report is irrelevant to cryptozoology because of insufficient evidence is inconsistent with the implied premise.

If you can show that evidence for a particular cryptid is flawed or insufficient, you can argue against its validity. It may be wiser to spend valuable resources on potentially more productive projects, but discarding a cryptid solely on quantity of reports without taking other factors into consideration is fallacious. Cases in point include a number of deep-sea encounters with elasmobranch or teleost fish which have only occurred once or twice because very few individuals visit such habitats.

Begging the Question

Begging the question is the fallacy which restructures the original premise into the form of a conclusion, so that the conclusion is supporting itself rather than being supported by objective facts. Circular reasoning is the extension of multiple premises, so that they are linked to reaffirm each other.

"I heard a Bigfoot scream last night. It sounded just like screams other Bigfoot investigators have recorded."

or, in premise/conclusion form:

"Bigfoot investigators have recorded screams they think are Bigfoot.

"Therefore, the similar screams I heard must have been made by a Bigfoot."

An assumption [*certain screams were made by Bigfoot*] cannot be used to support itself as a conclusion [*a certain similar scream was made by Bigfoot*]. If you did not see the animal making the sound, and have no objective evidence that a particular species could make it, the only logical conclusion is that it was made by an unidentified animal. The fact that similar screams have been recorded and attributed to a Bigfoot does not matter, as we have no way to objectively evaluate whether Bigfoot did in fact make them. While that does not logically rule out Bigfoot, it does include any number of known species which are just as likely, if not moreso, to have been responsible for the screams.

Question-begging Analogy

This fallacy relies upon similarity to attribute characteristics which may in fact be invalid.

"Gorillas are herbivores, and Bigfoot are pretty much like Gorillas, so Bigfoot must be herbivorous."

or,

"Gorillas are similar to Bigfoot.

"Gorillas are herbivorous.

"Therefore, Bigfoot are herbivorous."

Similarity is not reason enough to make a conclusion. There are many examples in nature where similar species have distinctly different behaviors. (Also, for those wondering, note that *Bigfoot*, like *moose*, can be singular or plural.)

Straw Man Argument

This fallacy attacks an argument that has little if any relevance to the opponent's main point.

"Large unidentified marine animals are unlikely to exist because most lakes are too small to support viable populations."

Marine refers primarily to oceans and seas. Lakes are categorically distinct, and should not be the focus of arguments regarding unknown marine organisms.

Complexity Fallacy

Complex questions or statements combine two distinct propositions, expecting them to be accepted or rejected together. If you came across an individual who expects you to accept or reject all evidence for both Bigfoot and North American ape-like primates simply because they are both purported unknown species, that individual would be offering a complex fallacy. Instead of accepting or rejecting both cryptids together, you should examine the evidence for each cryptid individually. Similarly, if someone asks, "Do you think that Bigfoot and the Loch Ness Monster exist?," they are offering two different questions which should be addressed separately.

Invincible Ignorance

Invincible ignorance is the fallacy that new evidence need not be considered because it would not change one's opinion. The truth of a certain belief has been established, the arguer believes, so new evidence is dismissed before it is investigated.

"No, I'm not going to look at the footprint. Bigfoot can't exist. It is impossible for a mammal of that size to remain undescribed in North America."

In this case, the arguer is certain that a truth [*the impossibility for a large mammal to exist unconfirmed in North America*] is established prior to investigation and that other evidence need not be considered. Don't elevate assumptions and opinions to the level of facts. You can argue for improbability, but carefully examine all pertinent facts—especially if you are making claims relevant to those facts.

This particular problem is widespread within mainstream zoology and anthropology, primarily because of the potential for damaged reputations. Peer pressure is as high among professional scientists as it is in the schoolyard. Fortunately, we are seeing a shift in attitudes, especially among those who detect blind spots overlooked by colleagues and generously examine alleged evidence for cryptids.

Ad hoc Arguments

Ad hoc arguments are invented and added to a failing theory in an effort to explain away discrepancies, rather than reexamine the original premises. An investigation will rarely start out with full knowledge of all pertinent factors, so new assumptions or revisions will often be necessary throughout an investigation. The continuous invention of arguments or revision of theories to explain away problems, however, is the mark of an *ad hoc* rescue fallacy.

“We don’t have any Bigfoot skeletons today because giant skeletons found in America’s past were all carted off to museums and stashed away so that prevailing theories wouldn’t be upset.”

The question of absence of Bigfoot skeletons is an interesting one, but it lends itself to conspiracy theories. Rather than examining the assumptions and arguments behind whether we should even expect to find Bigfoot skeletons, some individuals have tried to divert blame onto supposed museum collections that have caverns full of lost artifacts. When an argument fails, go back and critically examine the assumptions and logical arrangement before tacking on wild theories.

Unwarranted Assumptions

Fallacies of unwarranted assumptions are specifically based on false or unreliable premises. Unwarranted assumptions are the basis for many common fallacies.

“Bigfoot must exist—this website lists hundreds of sightings. They have been investigating reports for years.”

or,

“This website lists hundreds of Bigfoot reports.
“Therefore, Bigfoot must exist.”

Evidence must be critically examined, and not just assumed to be true because of its source. Don’t believe everything you read.

Equivocation

Linguistic confusion includes equivocation and slippery slopes, where ambiguity or vagueness confuses an issue. Ambiguity can be the result of poorly defined context, careless sentence construction, or poor word choice. Equivocation is the use of a specific word or phrase in more than one sense in the same argument, without distinguishing between the separate meanings.

"There are no Bigfoot or Yetis. Mount Everest has been explored too many times without finding any real evidence."

Not the only problem with this example, but note the confusion between Bigfoot and Yeti. These are two distinctly separate ethnozoological genera, from different regions of the world, and should not be confused with each other. Evidence against one is not necessarily evidence against another. Experienced investigators see this particular confusion regularly in the media—reporters often lump ABSMs (the generic cryptozoological acronym slang for bipedal primate cryptids, from *Abominable Snowmen*) together. Clarify your arguments with proper word choice. Confusion will not help them.

Unwarranted Extrapolation

This fallacy predicts results which are not justified from the evidence presented. Often, the extrapolation ignores contrary evidence.

"If there was a black panther in the area, we would know for certain because it would be roadkill by now."

This assumes that the presence of the animal would inevitably lead to a specific outcome. This is a

particularly rampant fallacy from those arguing against, for example, the survival of eastern cougar.

Acknowledge that past history may suggest a higher probability of certain events, but recognize the assumptions and limitations of probability analysis. This is especially necessary when actual studies, and therefore assumptions, are limited to distant geographic locations [*e.g.*, southern Florida]. Environmental variables like topology may be more significant in their influence than we acknowledge at present.

Slippery Slope

A slippery slope can refer to a) the unwarranted assumption that a continuum of characteristics makes the creation of definite distinctions impossible or b) the unwarranted extrapolation that a particular circumstance will inevitably lead, stepwise, to a specific, and usually negative, outcome.

“Because we don’t know whether Bigfoot really exists, or what its true anatomy might be, we have to assume that all strange hominid-like prints found in North America might be Bigfoot.”

We do see variations in, for example, number of toes in unusual hominid-like trackways in North America. There is, however, no logical reason stopping an investigator from restricting research to specific characteristic forms [*e.g.*, five-toed tracks], if such distinctions are readily noted. There may very well be additional support for arguing that a particular character in footprints indicates a specific distinctive ethnoknown class or even a higher likelihood of hoaxing. Don’t assume that a range in characteristics precludes classification.

"We should not allow anyone to shoot a Bigfoot for scientific evidence, because that would open the door for anyone to shoot Bigfoot. That would lead to its extinction."

This chain of imagined events leading to extinction relies upon unwarranted extrapolation and appeals to emotion. The description of the species would, for example, be much more likely to trigger specific laws protecting it.

Hasty Generalization

Inductive fallacies produce gaps between the premises and the conclusion as a result of not considering all the evidence. Jumping to a conclusion, sometimes called a hasty generalization, is a common form of this fallacy.

"I saw a big, hairy animal disappear up the hill. It must have been Bigfoot."

or,

"That strange screeching last night must have come from Bigfoot, since it didn't sound like anything else I've heard."

These ignore, without due consideration, alternate possibilities. Don't jump to conclusions. Assess the facts critically and look for other possible answers. If you can't find any, ask another investigator to review the evidence.

Cluster Correlation Fallacy

This fallacy involves hasty generalizations about clusters in data—the clusters are assumed to have a single cause when in fact they may be due to coincidence or another cause altogether.

This fallacy is especially important to keep in mind when evaluating “flaps,” or clustered sighting reports from the same general time frame and same general region. An unknown species is not the only possible explanation for clustered sightings. Of course, one also has to be careful of *Sloppy Induction*, when a legitimate possible explanation for clustered sightings may be ignored.

Forgetful Induction

Forgetful induction is the biased sampling of premises which do not include evidence that may counter the argument.

“Bigfoot is unlikely to exist because there are very few food resources for large mammals to be found high in the Rocky Mountains.”

Honest, I didn’t make this one up. This comes from a text on science and pseudoscience (Wilson 2000). While the sections on logic are fairly well done, I caution readers to be aware of biased sampling of assumptions in his examples of “pseudoscience.” In this case, the idea that Bigfoot resides solely in the upper regions of the Rockies has no support. I don’t know where he came up with it, unless he is mistaking Bigfoot for a Yeti—*linguistic confusion*. Even then, most, if not all, Yeti investigators hold to the theory that those cryptids reside in the valleys between the high peaks, rather than on the snowcaps themselves.

If you feel compelled to make an argument, be sure you understand and acknowledge all the facts. You can’t just pick and choose the ones that fit your theory.

Faulty Analogy

Faulty analogy is the unwarranted assumption that superficial resemblances imply significant similarities.

"Cryptids and UFO's are both mysterious phenomena, so if most UFO's have been found to be hoaxes and misidentifications, most cryptids must also be just hoaxes and misidentifications."

Generic characteristics do not dictate relationships. Classifying separate subjects as *unknown* does not mean that both subjects have similar origins. Discard the superficial. Look closely at the intrinsic nature of what you are investigating.

Post hoc Fallacy

The *post hoc* fallacy assumes that a causal relationship has been confirmed just because one event happened after another. Other *confusing causes and correlations* assume that because a correlation between different factors can be shown, a causal relationship must exist.

"That strange footprint found on the Smith farm must have been made by the same creature that was seen in Folsom Park a week earlier."

Maybe it did, maybe it didn't. Without seeing the creature make the footprint, or having more incriminating evidence, a causal relationship should not be directly inferred. Don't just assume that one thing must have led to another.

"All Bigfoot sightings in this state have occurred during a full moon. Bigfoot must be more active during a full moon."

Two variables may be directly connected (one causes the other), or both may share the same cause, but they may also be entirely coincidental. Don't assume that correlations prove that two factors must be related to each other.

False Alternatives

False alternatives create a choice between distinctly different alternatives (in, for example, an either/or scenario) while ignoring other possible alternatives.

"You either believe that Bigfoot exists or you don't."

This statement polarizes a circumstance, creating the illusion that no other alternatives are available. Many investigators don't *believe* one way or the other, but continue evaluating reports for sufficient evidence to determine whether the cryptid exists. Be aware of alternate viewpoints.

Fallacy of Moralism

A fallacy of moralism argues that just because something is, that something ought to be.

"Traditional zoological study discovers countless new species, and doesn't require any help from cryptozoology."

Circumstance alone does not oblige us to stagnate.

Supplanting or supplementing methodology may be necessary as circumstances change. Just because a traditional methodology exists, does not mean that it has an inherent right to be the sole methodology.

Fallacy of Composition

A fallacy of composition argues that what is true of individual constituent parts must be true of the whole.

“Cryptozoology will never be able to determine whether Bigfoot exists, because no investigator has the necessary skills or experience to solve the problem on his or her own.”

While individuals may be limited, those limitations can be overcome when a group works together. Remember that what is true of an individual is not necessarily true of a group of individuals.

Fallacy of Division

A fallacy of division argues that what is true of the whole must be true of the individual constituent parts.

“Because cryptozoology’s ultimate goal is to prove whether or not a cryptid exists, every investigator should be focusing on field work, or they are not truly involved in cryptozoology.”

An overall goal requires many stages, and each stage requires a distinct set of skills. Not every investigator will be able to work effectively at every stage. Understand that what makes up the overall framework may require the combination of distinct and disparate stages and actions.

Fallacy of Negative Proof

A fallacy of negative proof (*argumentum ad ignorantium*) argues that if a statement cannot be shown to be true, its contradictory statement must be true.

“Bigfoot don’t exist. There’s no proof that they do.”

The inability to confirm or disconfirm something is not evidence in and of itself. Don’t argue from lack of evidence. Of course, some folk will offer, “I have no evidence for unicorns in my sock drawer, so I can’t prove they don’t exist there.” The obvious question to such, “Exactly how many sightings do you have of unicorns in your sock drawer?”

Ad hominem

Fallacies of irrelevance include those arguments where the premises have nothing to do with the conclusions being made. Personal attacks (*ad hominem*) draw unfavorable attention to the opponent rather than discuss the issue at hand. These include not only attacks on character, but also suggestions why the opponent might be expected to take a disputed position.

“Well, of course he is going to say lake monsters don’t exist. He’s part of the scientific establishment, and you know they disagree with anything they don’t understand.”

An individual’s position in a scientific or governmental establishment has nothing to do with whether lake monsters exist. Harping on conspiracy theories is unproductive at best, and foolish at worst. Stick to the issue. Argue from the facts rather than from irrelevant points.

Appeal to Emotion

Appeals to sympathy and other emotions [fear, pride, love] are fallacious.

"A real scientist would not pursue cryptids. Don't you want to be a true scientist?"

Rather than examining the issue itself (whether cryptozoology has merit), this argument tries to persuade using acceptance by peers. Argue the merits of cryptozoology itself, rather than attempting emotional persuasion. I have seen a similar appeal within certain segments of the cryptozoological community, where someone will ask how many others "believe" in Bigfoot or some other cryptid. Appeals for emotional acceptance should be understood as having no significance regarding a particular cryptid's existence.

Appeal to Tradition

Appeals to tradition, or to inexperienced authorities, are fallacious.

"Science has no need for cryptozoology. Traditional collecting has done fine in the past, and will do so in the future."

Ignoring alternative methods just because "we've never done it that way," reeks of desperately clinging to the past. If a traditional methodology is used because it is convenient, financially feasible, or better understood, all fine and well. But different methodologies should not be rejected merely because they are not commonly used.

Fallacy of numbers

The fallacy of numbers attempts to overwhelm an argument with irrelevant data.

"We know that Bigfoot exist because thousands of people have seen one. That many people can't be wrong."

Quantity alone is not authoritative. Evaluate the evidence itself, not the amount of evidence. An example of how numbers might be skewed comes from listings of Bigfoot sightings on the East Coast. Certain areas (*e.g.*, Harford county, Maryland) have high numbers of published sightings. These should not be construed as evidence for a large endemic population of Bigfoot. Other factors (*e.g.*, active local investigators, increased periods of media coverage) contribute to such high numbers.

Poisoning the well

Poisoning the well is the fallacy of manipulating a debate so that anything an opponent states can be dismissed as false or unreliable. Similarly, a *genetic fallacy* is one in which the origin of a premise is deemed more relevant to the credibility of the premise than objective investigation.

"He's a cryptozoologist, so you know he's going to believe in all kinds of weird t/hings."

Rather than arguing the merit of particular cases, this statement creates the illusion that a cryptozoological investigator must have a specific perspective, and therefore any assertions coming from that investigator are inherently tainted. This is, of course, very similar to an *ad hominem* attack.

Of course, we live in the real world, not just one of ideas and mathematics. Logic cannot dictate which beliefs and opinions to hold, or how we should feel about the natural world. We should strive, however, to create logical arguments rather than trying to persuade with emotion or wishful thinking.

There seems to be an unspoken belief among some enthusiasts that science and logic fetter exploration. This just isn't true. By applying logic and working from an understood methodology, cryptozoology will move forward unencumbered by blinding preconceptions or unrestrained speculation.

CHAPTER FOUR

An Ethnozoological Foundation for an Investigative Methodology

“‘The Bogey of Cradock Marsh,’ is one of the earliest traditions, and is to-day one of the best known. This bogey, whatever it may be, whether man or beast, has been sought by armed hunting parties for several centuries. By day and by torchlight, its trail of foot-tracks has been followed only to be lost as the weird cry of ‘Yahoo! Yahoo!’ resounds through the dismal wastes of marsh to warn the curious of the futility of their quest, and to make the blood of the half-hearted searchers run cold.”

— Jennings Cropper Wise
Ye Kingdome of Accawmacke (1911)

All cryptids are folkloric.

That is an uncomfortable statement for many enthusiasts. The dilemma comes from a misunderstanding of what folklore entails, and how it is manifest. Folklore is not a term of denigration—it is the cultural expression of customs, traditions, and beliefs. Not all folklore reflect objective truth, but neither does all folklore dilute objective truth. The idea that folklore must be false, or at best is a foggy notion of reality, misses the point altogether. Cryptids are folkloric because they are ethnoknown—they occupy a place in an ethnozoological scheme even though they are still unverified by science.

There is no one definition of folklore which adequately defines it to everyone’s satisfaction. Definitions emphasize *folk* or *lore*,

but simplicity and sufficiency appear at odds with this particular subject. We can best understand what folklore includes by examining the two parts separately.

As Dundes (1965) noted, *folk* refers to any group of people who share something in common, no matter what it is. Any group, large or small, brought together by culture, interest, experience, or geography, will form its own traditions over time. Location is not important. Those who live in cities today have folklore, just as those who lived in rural isolation a century ago did. For cryptozoological investigators, our *folk* of interest may be a traditional native group in Cameroon, a small town in Appalachian Virginia, Gulf Coast offshore oil platform divers, or even a global coalition of marine biologists. Any group acknowledging animals which have not been verified by science is a potential folk target for future research. And, for the record, cryptozoological enthusiasts do indeed form a *folk* of their own.

Lore is the substance of folklore, or that which is actually passed along. It encompasses such cultural elements as myths and legends, jokes and proverbs, curses and blessings, recipes and gestures, children's games, folk songs, folk medicine, and folk beliefs (Dundes 1965). Not all folklore is spread through spoken words—dances, quilt designs, fence types, epitaphs, and folk art are all considered folklore. One must be careful to separate true folklore from what has been called *fakelore*—stories sanitized or concocted for commercial purposes (Utley 1965). Many anthologies of folklore actually qualify as *fakelore*, because the tales are watered down or muddled together to create more entertaining stories for children.

As we are principally concerned with reported animals that are unrecognized by current systematics, we will examine *ethnobiology*. Ethnobiology, as Berlin (1992) noted, concerns itself with two questions: How does a society view nature? How does a society use nature? Specifically, we look at folkbiology, which is how a society or group classifies the living species they encounter (Atran 1990). Traditional folk names for plants and animals are of interest to science because they permit ethnobiologists to study how societies from different parts of the globe comprehend and classify the natural world, (Diamond and Bishop 1999) and allow

biologists to then explore the traditional local knowledge of those recognized species.

Why do People Name Animals?

When ethnobiologists first examined how different people groups viewed indigenous species, they employed a utilitarian approach. In other words, they contended that people primarily recognize and name those plants and animals which are used as food or in the creation of material goods. As ethnobiologists began looking more closely at different peoples, they realized that this approach did not adequately explain why so many species without any recognizable economic use were specifically named. Berlin (1992) noted, for example, that over half of the mammalian species named by the Peruvian Aguaruna and Huambisa have no obvious value as food or for material usage.

To answer this problem, ethnobiologists suggested that there is an intellectual need to classify non-economic species based on an innate human need for order. Irving (1958) provided one example from a Native Canadian group:

"We may also wonder what purpose was served for the old-time Indian in naming every species of bird. Only a few kinds of ducks and ptarmigan were important as food, although any sizeable bird that could be obtained was eaten . . . But in a practical way birds belong to one of the least important classes of animals. Since it is not a practical necessity, this meticulous cultivation of knowledge that is shown in the complete naming of the avifauna represents an exercise satisfying the desire of man for intellectual activity. After we began to receive explicit information about birds from the people at Old Crow, we found that their accounts were interwoven with tales of other events and experiences at the localities and times when the birds were observed. As I became better acquainted with the people, their

subjective appreciation of form, colour, action, and song were often added to the signs of recognition. Later it became clear that many birds were the principal figures in delightful and often intricate stories."

The problem with this approach, Berlin (1992) argued, is that it reflects the idea that ethnobiological classification is a mental construct of human society. This is part of the ongoing relativist-comparativist debate. A relativist will argue that species must be the result of imaginary hierarchies set up in the same way as any social or cultural organization, because the natural world is continuous in reality, and only made discontinuous through the selection and organization of specific characters in biological systematics. The comparativist, in contrast, considers biological species to be real natural groupings which objectively appear as distinctive clusters, especially as many people groups restrict themselves to a local or regional environment. Not all of these groupings will be distinctive, but most will include a prototype, or typical species. Related species within the grouping will be considered less typical, but will be lumped with the typical species because of their overall resemblance. Berlin asserted that as ethnobiologists, people don't construct order—they discern it. As Atran (1990) noted, we all see gaps between groups of organisms in our local environment. No real cognitive effort is required for people to see and remember these differences, and they become easier to remember when noteworthy characteristics become part of the assigned names (Berlin 1992). [For a detailed discussion of generic perception similarities between disparate cultures, and current theories on such, see Atran, *et al* (1997).]

Which animal groupings become part of a given folkbiology classification depends on how well they distinguish themselves from the background jumble of related species. Not every organism in a given region will be named and classified. Berlin (1992) noted that traditional societies acknowledge only a small percentage of the actual plant and animal species found in their home range. Those which are recognized are considered by ethnobiologists to be the most *salient*, or biologically distinct. The most important characteristic which leads to ethnobiological distinction is size.

As Hunn (1999) observed, a people group may be knowledgeable about the plants and animals in their region, but they still overlook a great portion of the local biodiversity because it is not visible to the naked eye. An organism must be large enough to be seen, obviously, to be integrated into an ethnobiological classification.

Besides size, physical and ecological salience are important factors. Physical salience refers to the morphological distinctiveness of an organism [color, pattern, peculiar anatomy], while ecological salience reflects the likelihood of encounters with an organism when its biogeography and phenology are considered. Organisms which are diurnal, abundant, and widely distributed have a greater chance of ethnobiologically recognition. Nocturnal, secretive, solitary, or migrating species have less ecological salience than their counterparts.

The basis for any folk-classification scheme is the idea of *essence*. In ethnobiology, essence is the innate character of self-identity in an organism. Regardless of differences in size, morphology, or gender, this character determines what the organism is (Gelman and Hirschfeld 1999). Atran (1990) noted that the recognized essential nature of a living kind underlies the variation that is often found within animals. A tiger without stripes is still considered a tiger, as is a tiger that has lost its tail. Spotted lions are still lions and pygmy elephants are still elephants. Atran (1990) notes that most people groups believe that any given organism will, because of its essence, normally mature and grow in the manner of others of its own kind.

Using readily perceived essences, a people group may then differentiate or generalize as conditions allow further observation. This may depend more upon cultural characteristics than the biodiversity of the local region. Berlin (1992) observed correlations between folk plant taxa and the form of subsistence that a given people group practices. High levels of cultivation, as opposed to foraging, may create a greater recognition of plant life. With animals, however, environmental and ecological factors appear more important in predicting how many generic taxa a cultural group may recognize.

Principles of Folk Taxonomies

There are several proposed ethnobiological classification schemes. Note that these are not meant to be scientific schemes. The terms *genus* and *species* in folkbiology do not directly translate to the terms *genus* and *species* in zoological nomenclature. The scheme used here follows Berlin's (1992) suggested classification: Kingdom, Life-form, Intermediate, Genus, Species, and Variety.

Berlin (1992) observed that one objective biological grouping "literally jumps out at the viewer, something like a series of snow-covered mountain peaks on an exaggerated relief map." This group is discerned automatically by most people groups. Finer distinctions and generalizations can be noted, but only with studious effort. This fundamental category is the *genus*. As the smallest biological unit easily recognized in a local environment, the folk genus draws perceptual recognition and elicits a response in the form of a common name. The genus must be recognizable at a glance and without close study—it is "first recognized and afterwards defined," as Berlin noted. The natural and automatic discernment of the folk genus is what triggers the willingness to create a "distinctive simple name."

The *species* level partitions the folk genus by denoting special or distinctly different traits. A folk genus is recognizable at a glance, while a folk species requires closer examination. The differentiation is often given as *it either has this trait, or it does not*.

Folk species are not always terminal taxa. Berlin (1992) noted that a folk genus may represent a terminal taxa in the form of generic monotypy, where a sole representative of a biological genus is considered, as a folk genus, an extension of the folk species. On the other side, a folk species may be itself divided into *varieties*, where the organism may be distinguished by colors or other characters. This differentiation is rare, and more often accompanies domesticated varieties, but is occasionally seen with wild species.

In some cultures, similarities between folk genera may be recognized, but no one bothers to give those groupings names (Atran 1990). These belong to the *intermediate* rank, and more often than not, are covert and unnamed. Berlin (1992) points out that these covert categories can be significant in the overall structure in an

ethnobiological classification, even when you don't immediately notice them. They can be detected by the use of phrases with kinship metaphors—*companion to*, *brothers*, *members of the same family*, *relative to*, and the like. When such a relationship is given between organisms which do not appear to be phenotypically similar, it may be because they live near each other, but one is not clearly classifiable with any other folk genus (Atran 1990).

Life-forms are assemblages of "larger exclusive groups" like trees, fish, and insects (Atran 1990). Life-forms may be classified by only a few shared characters. Because these are apparent characters, the groups do not necessarily correlate with the higher levels found in biological systematics. Life-forms often incorporate disparate biological groupings, which may be due to cultural significance like domestication, or to very general defining characteristics, such as lack of limbs in snakes and worms. Berlin (1992) noted that while one tribal people group refers just to snakes as *Tobelo o dodihna*, another people group incorporates reptiles, eels, centipedes, and worms into the life-form *kaapa'raara*. The New Guinea Rofaifo society includes all birds and bats within the life-form *nema*, except for the flightless cassowary.

A *kingdom*, plant or animal, is sometimes covert, and occasionally considered to be just a larger encompassing life-form. Most people groups will recognize that there is a distinction between plants and animals, but may or may not have linguistic phrases differentiating them. Atran (1990) referred to this category as the *unique beginner*. He notes that a single word, like *beast* for nonhuman animals, is often used to denote kingdoms, but some people groups are more descriptive. The Timor island Bunaq society, for example, refers to plants as *muk gubul nor*, or "hairs of the earth."

Occasionally, there is a *residual* category (Berlin 1992), where a native states that an organism is "just an herb" or "just a spider," without having a given name for it even if there is a recognized name for a related biological genus or species. These residual categories act as a catch-all for undifferentiated biological species and serve as a form of folk subgenera.

A folk genus may encompass a wide range of diverse biological genera which are merged because they are perceived to be closely related. A biological genus that is monotypic has a better chance

of being distinctly named in folk classification than does a biological genus which melds into the backdrop of a polytypic landscape. It is also possible for a folk genus to include two or more folk species which themselves belong to different biological genera. This occurs when two closely related biological genera have obvious morphological similarities which suggest that they are related folk species with the same natural kind (Berlin 1992). Another potential area for confusion is when two related biological species are given separate folk genus labels. This usually occurs when the two species inhabit distinctly different ecological niches (Atran 1990).

A folk genus which is subdivided into folk species or is accompanied by residual subgenera is represented by a single type-species or prototype which exemplifies the essence of that genus. The folk genus may be used to indicate either the prototype or related folk species, but whenever the prototype is differentiated, it is usually with a gloss indicating it is *real*, *original*, *genuine*, or some similar phrasing (Berlin 1992). Berlin noted that cultural significance, phenotypic distinctiveness, abundance, and size support a given folk species' position as a prototype.

How do People Name Animals?

In ethnobiology, Berlin (1992) noted that names for plants and animals may be primary [dog, horse, catfish] or secondary [red wolf, timber rattlesnake]. Complex primary names may or may not include a component which refers to its classificatory position. A bullfrog is a frog and a catfish is a fish, but a silverfish is not a fish. Secondary names usually include a component referring to a classificatory position [sugar maple, red fox], and are usually found in contrast sets with a shared constituent [red fox and gray fox]. Folk genera and higher taxa are usually given primary names, while subgeneric taxa are usually given secondary names. A folk species may be given a primary name when it is a prototype of the folk genus, and therefore shares the primary genus name by extension. A secondary name might be applied when it is necessary to distinguish it as the "real" species when compared to related folk species.

Names, especially secondary names, will often refer to typical characteristics of the organism's morphology, behavior, or habitat preference [spotted turtle, snapping turtle, wood turtle]. Names may be shared and differentiated by context, when two distinct organisms share a common resemblance. Fradkin (1990) noted that the Cherokee used the same term, *selagwoya*, for both the rough green snake and for the bear-grass (*Eryngium* sp.), because of the resemblance of the long thin grass to the serpent (or *vice versa*). Fradkin also observed that one species of ant with a hard body case was given two names, with the alternate name (*nvuyuhnuwi*) shared with the "mythical monster 'Stone-Clad,' or 'Stone Man,' who was invulnerable by reason of his stony skin."

The manner in which native peoples recognize essential characters is not the same as those used by zoological systematists. Bulmer and Tyler (1968) noted that the Karam of New Guinea use certain obvious morphological criteria in their classification of frogs, but ignore some characters which Western scientists use to distinguish biological genera. Diamond and Bishop (1999) pointed out that the Ketengbans do not use field marks or details of plumage which are usually only seen through a birder's binoculars. Rather, they use the bird's "song, silhouette, position, behavior, and general appearance." Because the Ketengbans know which birds to expect in an area, they aren't bothered by having to know related species from outside the region. Bulmer and Tyler (1968) stated that there seems to be a *mental image* of the whole animal which is used to identify it, and that the whole animal does not necessarily have to be in view to make the identification. In one case, a large group of Ketengbans would simultaneously shout out the name of bird specimens as a collector produced them, often when only able to see parts of the birds.

Still, even when they run into introduced species, or encounter new species when they foray into adjoining lands, native peoples easily integrate those species into their own folk classification. When Diamond (1966) experimented with a group of Fore men from the New Guinea highlands by taking them into even higher elevations, they called 91 out of 103 newly encountered avian species by the names of the Fore ethnoknown birds which were the most closely related biological species. Diamond observed

that the Fore men were able to see the underlying similarities of form and behavior even with different colors and sizes in the birds: "At Karimui one of my Fore assistants collected a huge, black, short-winged, ground-dwelling bird, which neither he nor I had seen before. While I was puzzled by its affinities, the Fore man promptly proclaimed it to be a *petetóbeye*, the name for a graceful little brown cuckoo which frequents trees in Fore gardens. The new bird eventually proved to be Menbek's coucal, an aberrant member of the cuckoo family, to which some features of body form and leg and bill shape betray its affinity."

As noted previously, there are cases where two or more related biological species are given the same name. Diamond and Bishop (1999) stated that the Ketengbans apply the same common name to a pair of related birds even though they recognized differences between them. Salience is important in determining whether a biological species will be differentiated in a folk taxa. Two small related species seen only in the distant rainforest tree-tops may never be differentiated. Western systematic practices sometimes appear arbitrary when compared to native folkbiology. Berlin (1992) noted that in Huambisa fish classification the biological genus *Abramites* and several species of *Leporinus* are categorized in the folk genus *katish*. Western scientists combined both genera until the 1900s, when they were systematically differentiated not on any immediately recognizable gap, but by a few characters the revisers considered relevant to speciation.

What especially interests the cryptozoological investigator, of course, are the folk genera and folk species which indicate biologically unknown species. Wang *et al* (2000) noted that Tibetans clearly differentiate between the typical blue sheep, *gong-na* or *high mountain sheep*, and the dwarf blue sheep, *rong-na* or *low mountain sheep*, while biologists still struggle with the taxonomy. Diamond and Bishop (1999) related that mammalogists in New Guinea ran into natives who insisted that a single biological species of rat had two folk names, leading to the discovery that two rodent species were involved. Not all cases will prove fruitful, but a careful study of ethnozoology may lead to new discoveries. The same authors noted another case—Ketengbans insist that there is a third species of Lorikeet closely related to the Yellow-billed Lorikeet,

Neopsittacus musschenbroekii, and the Orange-billed Lorikeet, *N. pullicauda*. They refer to the former as *piteléng*, but to the latter as either *Nyisbélek* or *alarií*, suggesting that they perceive some differentiation within the biological species *N. pullicauda*. Diamond and Bishop noted that while there might be a cryptic lorikeet species there, it was also possible that the Ketengbans were differentiating in error.

Errors and Variations in Folk Biology

Erroneous beliefs about animals are not random, Bulmer (1968) asserted, and do not simply come from misinterpretation of perceived animal behavior. Rather, they are constructed within the constraints of a culture's spiritual beliefs. [Spiritual, going beyond religion, to encompass cosmological and anthropological beliefs.] Bulmer noted that the "natural history of nonsense . . . tends to go with zoologically inadequate taxonomy." It is not always easy to counter improbable claims because of physical difficulties and social or psychological pressures which hinder the observation or interpretation of the phenomenon. It can be especially difficult to understand zoological belief errors when the individuals correctly perceive other aspects of natural history. As Goodman and Hobbs (1994) observed, the Bedouin have the skill and experience to detect a viper that is hiding beneath the sand. But this knowledge is accompanied by belief errors—that vipers eat sand, and that the entire body of the snake is deadly.

Transformation, where one folk species is asserted to change into a second folk species over time, is not an uncommon belief. When it involves distinct biological species, it is obviously an error. It may not even be believed to occur with every specimen in the folk species, as in a case where the Karam believe that one small rodent species and one larger marsupial species reproduce after their own kind, but sometimes a member of the rodent species will transform into the marsupial species (Bulmer 1968).

Bulmer noted another probable error in Karam ethnobiology, where certain vocalizations are attributed to an earthworm. Bulmer's investigation led to the conclusion that the calls come

from a frog, *Xenobatrachus* sp. At least seven biological species of *Xenobatrachus* are lumped by the Karam into one taxon, *gwnm*. Most of the Karam know that there are varieties of *gwnm*, but do not distinguish between all of the known biological species. When they are asked about the calls of *gwnm*, the Karam usually choose the call of the largest biological species. This leads to several residual calls by the smaller *Xenobatrachus* species, which, Bulmer suggested, are then attributed to earthworms. Because the frog naturally preys on the earthworms, it is often found associated with them, which contributes to the confusion.

Berlin (1992) noted a further cultural problem that can create difficulties. While experimenting with various opossums in South America, he discovered that there appeared to be two distinct conceptual classifications within the native people group. The two schemes were found to be stable, but mutually exclusive, so that "one cannot escape the conclusion that if a person with System A uses the term . . . in a conversation with persons possessing System B, they will be thinking and talking about different creatures."

Etymological variations might occur over time, as the original meaning of a word is lost or forgotten. Kilby (1935) investigated the root of the name "salamander," as applied to pocket gophers in the southern United States. This was a puzzling term, and the best suggestion given had been that these rodents were often active in the ashes of forest fires—taking the term "salamander" back to its mythological roots. Kilby met an old woman, formerly a plantation slave in south Georgia, who recognized the word: "The old woman recognized the term to apply to the pocket gopher, but when she repeated the term she said 'sandy-mounder' instead of 'salamander.' Further questioning revealed that 'sandy-mounder' was the name applied by the old negroes to the pocket gopher and that the terms 'salamander' and pocket gopher were unknown to them. The old woman's pronunciation of 'sandy-mounder' was much like that of 'salamander.' Since the pronunciation of the two terms are similar it is possible that the descriptive term 'sandy-mounder' was interpreted as 'salamander' by people familiar with the latter term."

Collecting Ethnozoological Information

The folkbiology of a given people group may provide clues to unknown biological species, but first you have to collect the folkbiology for evaluation. There are several techniques for collecting ethnobiological data, each with their own pros and cons. Yet even before data collection begins, you may have to cross significant cultural and linguistic communication gaps to verify folk nomenclature.

One common method in ethnozoology is to use a group of prepared specimens and ask informants to examine and name them. The informants should do so individually, to keep social pressure to a minimum. While this allows a good number of informants to view specimens in a structured environment, it does have disadvantages. Preserved specimens may be distorted from their natural appearance, confusing the informants. Diamond and Bishop (1999) discovered that New Guineans often gave conflicting names for the same species when shown live animals and preserved specimens. Sometimes no name would be produced for the preserved animal. This was due to the identification method of the New Guineans, which incorporated voice, behavior, posture, and habitat rather than inherent morphological characters. Diamond (1989) found that one New Guinea informant was unable to decide whether a specimen belonged to one of two species of pitohuis, even though he had proven gifted in locating both birds in the field. His recognition of the birds' distinctions were directly related to their activity and vocalizations. A second problem involves the limited nature of any collection of preserved animals. It would be unlikely to have available a group of specimens which includes most of the indigenous species (Berlin 1992).

A similar procedure displays drawings or photographs rather than preserved specimens. As Diamond and Bishop (1999) noted, however, this methodology possesses all of the disadvantages of using preserved specimens, with the additional difficulty of dimensional issues. Members of nonliterate societies may have little experience with estimating size and three-dimensional forms from a two-dimensional image. It is all too easy for investigators to inadvertently cue informants to an expected or even "hoped

for" answer. Diamond (1989) investigated birds in the Solomon Islands, and found a curious discrepancy. Elder informants provided names for all the birds they found in the field during the day. In the evening, Diamond showed them pictures from his field guide. When they came to an image of the lesser frigatebird, which they had seen earlier in the day, they called it by the name given to the willie wagtail, a much smaller bird. The only real similarity between the two birds are that they are both black and white. Diamond realized that the elders were relying upon size rather than overall shape and form, as the small picture on the page was much closer to the wagtail than to the frigatebird.

This may sound strange, but many of the skills that we take for granted are actually learned behaviors. Anthropologist Colin Turnbull (1961), in his classic work on the Ituri Forest pygmies, discussed a trip he took outside of that Congo forest with one of his pygmy friends, Kenge. Kenge had never been outside of the forest, and found the grasslands to be a source of wonder. After pointing out a variety of game animals, Kenge noticed a herd of buffalo several miles away. He asked Turnbull what kind of insects they were. Even after explaining that they were buffalo, Kenge refused to believe his companion. As they approached the herd in a jeep, Kenge watched in amazement as the animals grew larger. Turnbull noted, "I was never able to discover just what he thought was happening—whether he thought that the insects were changing into buffalo, or that they were miniature buffalo growing rapidly as we approached. His only comment was that they were not real buffalo, and he was not going to get out of the car again until we left the park."

Taking a different track is the methodology which uses the informant as a field guide, eliciting names for different plants and animals as they are encountered in a natural state. Diamond and Bishop (1999) used this method to learn about Ketengban bird names. While pointing out birds for identification, the authors questioned their guides carefully about the bird's description and ecology to make certain that they were, in fact, talking about the same species and whether the guides actually knew the bird.

This method starts out unstructured, being conversations about the species actually encountered, but can become more

controlled as the investigator asks the informant to name and describe categories of related animals or plants. The fact that the environment, and therefore encounters with specific species, cannot be controlled in the field is problematic, along with the amount of time that must be spent in the field with separate informants in order to get a balanced perspective. A more significant problem, however, is that vernacular names are of little use if the investigator does not have sufficient knowledge of the local fauna and flora to determine whether the names refer to scientifically classified organisms.

The best method for a cryptozoological investigator is derived from this last *conversational* method. Rather than tramping through the fields, however, an informant can be presented with a series of structured questions relating to the native fauna. Berlin's (1992) approach as an ethnobiologist can be easily modified for cryptozoological analysis. Walk the informant through a complete local classification of the ethnoknown fauna, and for each species, ask whether there are any similar animals, or *relatives*. Rather than just asking for names, it is important that these conversations allow for internal checks. As Diamond and Bishop (1999) noted, yes/no questions and leading questions should be avoided. The answers should provide a broad morphological and ecological description so that the questioner knows for certain that a given species is being discussed.

The selection of informants influences the knowledge gained through these conversations. A male's answers could differ from those of a female informant. These gender differences may be due to cultural subsistence (farmers vs. hunters). An individual's social status may also increase the level of knowledge they provide. Elders in a society may be under great social pressure to be authorities on all topics. Younger men may disagree in the absence of elders, but will usually defer while in their presence (Bulmer and Tyler 1968).

There is one unusual barrier which appears common in ethnobiological investigations—"informants are likely to withhold information from scientists whom they perceive to be ignorant about the subject" (Diamond and Bishop 1999). These researchers discovered that while informants enthusiastically gave zoological

information to them, they withheld information on mushrooms because they did not perceive the investigators to be knowledgeable about them. Similarly, Berlin (1992) noted that Aguarana women will not provide vernacular names for manioc to male ethnobiologists, because they believe men to be ignorant of cultivation matters. One further point should be made—certain cultures emphasize respect for others to a degree that can actually hinder interviews. This can come across, for example, with some individuals who will tell you what you want to hear, not to deceive you, but because they are trying to please you.

The greatest barrier in literate cultures is the fear of derision. It can be difficult to persuade someone to answer questions if they believe you will not take them seriously. You may need to warm up interviewees by offering some general information first, being careful not to lead the witness with your own opinions.

Gleaning folklore is as simple as listening. First, determine the group that interests you. Are you looking for specific reports of black panthers, Bigfoot, or sea serpents? Target those regions which have known reports—if there's one sighting, there may be more. If you are visiting a remote area which hasn't received much attention, you can try the conversational classification approach. Investigator Nick Sucik has had phenomenal success by speaking with Native Americans and asking them in everyday conversations if they have heard of any unusual or rarely seen animals. This requires preparation, as you need to be familiar with known indigenous species, but can successfully uncover cryptozoological leads.

A Note on Myths and Legends

I have, so far, focused on ethnozoology and the perceived animals classified by native peoples. I should not ignore folklore in the sense of myths and legends, *i.e.*, story-form presentations, which refer to unknown creatures. Quite a few cryptozoological investigators compile and critique historical tales [dragons, wild men, sea monsters] for the possibility that a biological species may be at their core. Heuvelmans (1990) demonstrated that several

known species like the giant squid, gorilla, whale shark, manta ray, Indian tapir, mountain tapir, and Komodo dragon were mythicized as monsters or ghosts before they were proven to be flesh-and-blood animals. Bayanov (1982) proposed, referring specifically to ABSMs, "The existence of mythological hominoids is a necessary, though not sufficient, condition of the existence of real hominoids." In other words, if such a creature does exist, it will be recognized and integrated, however vaguely, into the folklore of people groups who encounter it.

Colarusso (1983) replied to Bayanov's proposal by noting that "a monster with man-like properties need not suggest that the lore in which it appears in some way bears testimony to the existence, present or former, of a relict hominoid in the environment of the lore-bearers." Colarusso asserted that folklore is emotive, and functions by expressing a people's feelings about the world, rather than just describing the world objectively. He did agree that, with care and caution, some useful information could be gleaned from folklore—

"In so far as a tale lacks mystical, numinous, magical features, in short, in so far as it contains features that do not appear to serve an emotive, expressive function, then these features may be scrutinized for possible data regarding relict hominoids. Such scrutiny is worthwhile even if a portion of the story lapses into a highly magical tone" (Colarusso 1983).

Colarusso cautioned that a tale should be scrutinized from linguistic, folkloric, and cultural anthropological perspectives to winnow out confusing mythical or cultural elements. Becker (1985) suggested one form of mythical confusion—the application of a prior recognized mythical name to a newly encountered and unfamiliar animal form. Colarusso noted that folklorists are usually untrained in zoology, and may inadvertently designate animal behavior or form as mythical, when such would be endorsed as plausible by biological investigators.

Cryptids are folkloric. That does not mean that we focus on tall tales and myths. Rather, it means that all encountered animals, or ethnoknown species, become part of an implicit classificatory system—folkbiology. If we ourselves walk into a strange forest, we begin to discern and classify unconsciously. Without a close look, we would still note similarities to familiar creatures. If we encounter a unique beast, we may not have a ready comparison, but the animal will still become part of our personal classification scheme based on general traits. As encounters are discussed or mentioned by folk, the attributes may become muddled over time, but the prevailing characteristics will remain. The next time someone encounters a similar animal, the witness may then assume that s/he saw the same creature, perpetuating the folkbiological status.

Not every folk genera or folk species will turn out to be a unique biological species, but these fundamental units are the targets of our pursuit. The wholesale dismissal of ethnoknown species is as bad as indiscriminate acceptance. There is a line which must be walked if cryptozoology is to progress. Critical thinking must be paired with a stimulus for investigation. We need to move beyond the stagnant philosophy of “if it is there, it will eventually be found.”

CHAPTER FIVE

The Rationale for Cryptozoology

"The reptiles of this country are the rattlesnake,
the gartersnake, lizard, and snail."

—Meriwether Lewis

History of the Expedition . . . (1814)

To understand the need for alternative approaches to zoological discovery, let's look at the history of traditional discovery within the framework of North American science. Every continent has a unique history of exploration, but North America stands out as one land-mass where it appears obvious—to some professional biologists—that large species should not be able to exist unrecognized to science.

Brief History of Zoological Discovery in North America

Columbus and his crew initiated European exploration and zoological discovery in the New World. During their second voyage in 1493, they collected specimens and recorded observations of strange animals (Stearns 1970). The following century brought waves of travelers to these new continents. This was, however, a period when science itself, especially biology, was still an infant. As Elman (1977) noted, "The first explorations of this continent's flora and fauna, therefore were timorous probings, tentative and fantasy-ridden, sometimes disdainful of forms unlike those of the Old World or of no direct use to man. Observations of natural

life were incidental to the quest for riches or for the means of survival."

The Spanish led the first explorations, and we do see brief notes on some species they encountered. Coronado's quest for the Seven Cities of Cibola in 1540 spurred encounters with the first jaguar, herds of buffalo, and prairie dogs (Elman 1977). De Soto explored the Mississippi River and reported strange species like the paddlefish. Throughout the 1500s, New World explorers published accounts of their discoveries for fascinated European audiences. Oveido's *Natural History of the West Indies* [1535] was widely read in Europe and inspired many explorers (Evans 1993). Unfortunately, his superficial descriptions of such beasts as the manatee, alligator, sloth, and bird-sized spiders served only to titillate his audience, providing little scientific value. Monardes and Acosta also wrote books, but focused on practical subjects (Stearns 1970). Monardes was a physician, and so concentrated on medical botany. Acosta's four-volume *Historia Natural y Moral de las Indias* [1590] barely mentioned natural history beyond llamas and vicuñas.

It should not surprise anyone that accurate knowledge of the natural history of the New World was slow to spread. As Elman (1977) pointed out, "Each of the pioneering naturalists built his little wilderness outpost of knowledge on still earlier, simpler, often random observations . . . First came the observers, then the collectors, then the explainers, the more diligent examiners, the systematists, the insatiable experimenters and researchers."

By the late 1500s, other countries were exploring the east coast. Thomas Heriot visited the ill-fated Roanoke Island, Virginia, colony for a few months before returning to England to publish *A Briefe and True Report of the New Found Land of Virginia* in 1588 (Evans 1993). He described 28 mammals and 86 birds. John White arrived in 1585 and began a series of watercolor paintings of the flora and fauna, including alligators, sea turtles, pelicans, and other birds (Elman 1977). These were never published, but are still possessed by the British Museum.

In 1637, Thomas Morton published *New English Canaan*, which was "among the first books to devote close scrutiny to American animals" (Elman 1977). Very little activity was specifically aimed

at furthering knowledge of North American wildlife, however, until a significant development in England in 1662—the birth of the Royal Society of London.

Among the various scientific endeavors of the Royal Society was a push to promote experimental philosophy in the North American colonies (Stearns 1970). This, along with a natural fascination with new species, gave the Royal Society incentive to provide travel assistance and stipends to colonists in exchange for seeds and specimens (Evans 1993). Colonial governor John Winthrop, Jr., sent collections of New England specimens to the Royal Society in 1670-71. Virginia's Thomas Glover dispatched information to the Society through correspondence in the 1670s, but his account "contributed more largely toward the study of Virginia's economy than to its natural history" (Stearns 1970). Most other colonies provided little if anything toward the study of North American wildlife. John Josselyn did write *New-England's Rarities Discovered* [1672] and *An Account of two Voyages to New England* [1674], but while these were as complete a natural history on New England as had been given to that point, as Stearns (1970) noted, the fauna descriptions were scientifically inadequate, and focused on species of supposed medical value and of interest to the fur trade.

The last decades of the 1600s offered greater opportunities, as the Royal Society revived itself and provided outlets for colonists to publish correspondence. John Clayton wrote several letters in the 1680s and 1690s: one mentioned 45 birds found in Virginia; another focused on the domestic and wild animals of that region. Two Maryland colonists, William Vernon and Reverend Mr. Hugh Jones, sent observations and specimens from that colony in 1698 and 1699. Peter Collinson submitted notes on the natural history of the Carolinas. Other Europeans during this period also took advantage of opportunities to procure specimens in exchange for financing. James Petiver, a London apothecary, was one individual who corresponded with a number of colonists. Petiver received specimens from, among others, Benjamin Bullivant in New England, and Madam Hannah Williams in Carolina (Stearns 1970).

Most of the specimens sent to Europe were botanical—seeds and plants were in great demand for private and public gardens.

Colorful butterflies and shells were also popular, and some fortunate correspondents received reptiles, amphibians, and birds. European naturalists were particularly fascinated with rattlesnakes. With most correspondents, however, the shipments were sporadic at best. The colonists were concerned with creating a new life, which left little spare time for collecting specimens. Agricultural and commercial enterprises, as well as political activities, were of greater importance. Other studies were also given attention—geography, meteorology, astronomy, medical botany. At best, zoological observations and specimens were the result of random encounters rather than a serious survey of the native fauna. As Stearns (1970) observed,

“Most of the American colonists who played a role in this development were relatively minor contributors of information, feeding American scientific data, with ever-increasing accuracy and growing sophistication, to English and occasionally European patrons, who in turn synthesized this data with similar information gathered around the world and gradually fashioned the whole into an organized body of knowledge—the corpus of early modern science. Not until the last colonial generation—that of the Founding Fathers of the American Republic—were there American colonials willing and able themselves to become active participants in this process of synthesis and organization and to become contributors of scientific ideas (as opposed to mere data) in their own right.”

The eighteenth century brought periods of both progress and stagnation in natural history studies. Through the first half of the 1700s, amateur collectors [*e.g.*, physicians, apothecaries, ministers, merchants, teachers] continued their correspondence with European patrons. Stearns (1970) noted that North American amateurs contributed by acting as the eyes and ears of Europeans unable to visit their forests. With better training, these amateurs became more observant and communicated finds of greater significance. Their efforts allowed European scientists to pursue three objectives:

collecting variation in nature, classifying those variations in an attempt to find rational patterns, and labeling the variations with names that would be universally accepted.

Natural history writings in the early 1700s still betrayed a mixture of credulity and fact. John Lawson's *A New Voyage to Carolina* [1709], "was actually written as a piece of real estate promotion to interest settlers and land speculators" (Kastner 1977). Lawson was the surveyor general of the Carolinas. While he recorded personal observations in his journal, his published book is uneven and spotty in details of natural history. Cotton Mather of New England began corresponding with the Royal Society in 1712, primarily on "curiosities" like unusual meteorological events, livestock deformities, diseases, and strange bones. Mather's interest in these oddities was not especially unusual, though, being "in keeping with those of the overwhelming majority of his contemporaries, certainly with those being presented to the Royal Society and often published in the *Philosophical Transactions*" (Stearns 1970).

There was one decision by France which influenced the progress of western natural history during this period. In 1720, Pierre François-Xavier de Charlevoix proposed that France establish a series of trading-posts, instead of sending an expeditionary surveying force (Ewan 1950). This meant that many Rocky Mountain species, for example, would remain undiscovered until the Lewis and Clark expedition in the early 1800s. The French forts were built from 1731 to 1743, from Lake Superior to the Assiniboine. While individual French trappers and explorers continued to penetrate the western territory—e.g., the Mallet brothers' exploration of the high plains east of the Rockies in 1739-40—there were no organized French expeditions.

The British, especially those connected with the Hudson Bay Company, also established forts north of the French fur-trade districts, and did explore through the northwest. Company surgeons would send back specimens, and several, such as Nicholas Garry, Meredith Gairdner, and William Tolmie, made contributions to natural history in this manner (Ewan 1950).

Despite its shortcomings, scientific interests distinctly increased during the latter years of the Old Colonial Period, 1740-1770. John

Bartram, America's first native-born naturalist, created a large Botanical Garden near Philadelphia and often sent notes to the Royal Society. He not only provided botanical specimens to London merchant-trader Peter Collinson and systematist Linnaeus, but earned the title "King's Botanist" from King George III (Evans 1993). Bartram was known for his "encyclopedic knowledge of the natural history of America" (Stearns 1970), but he had little personal interest in classification or nomenclature.

Mark Catesby took two trips through Virginia and the southern colonies in the early 1700s. Besides collecting seeds and plants, he painted the plants and animals he encountered in the field. His *Natural History of Carolina, Florida, and the Bahama Islands* [1731] was a success, and established many common names like "blue jay" and "bluebird."

Other naturalists emerged during this period before the American Revolution. Dr. Alexander Garden gave numerous vertebrate specimens to Linnaeus for his studies in the 1760s. One of Linnaeus' students, Peter Kalm, arrived in the New World in 1748, traveling through the northeast and eventually publishing *Travels in North America*. While Kalm did make a few discoveries, he also spread misinformation, prompting Benjamin Franklin to warn against "'strangers that kept journals" (Evans 1993).

In 1744, Franklin, Catesby, and other scientists created the American Philosophical Society in Philadelphia. It languished for a period, but was revived with success in 1767. Still in existence today, the APS provided a center for scientific camaraderie and stimulus.

The American Revolution immobilized scientific progress for a period, as colonists had little time to spare for peripheral pursuits. It did, however, create a significant change in the perspective of Americans toward natural history. No longer was it just utilitarian. It became a matter of national pride, as the colonists strived to show both their own scientific independence as well as the excellence of America's natural features.

Boston's American Academy of Arts and Sciences was created in 1780, after John Adams heard the French praises of Philadelphia's American Philosophical Society (Stearns 1970). Thomas Jefferson's influence on American scientific progress

developed from his own research and through his encouragement of other scientific endeavors. Jefferson published his *Notes on the State of Virginia* in 1785. Besides detailing and discussing the flora and fauna inhabiting the vast forests within the Virginia territory, "Jefferson's real concern was to convey the excellence of American organisms" (Pauly 2000). Jefferson encouraged French botanist André Michaux in his studies, resulting in the first guide to North American plants—*Flora Boreali-Americana* (Evans 1993). Several other important American texts resulted from this patriotic fervor—Alexander Wilson's *American Ornithology*; Nuttall's *Genera of North American Plants*; Audubon's portfolios of birds and mammals. Charles Willson Peale opened his Philadelphia museum in 1786, emphasizing symbolic native specimens like the wild turkey, bald eagle, and American mastodon.

Pauly (2000) pointed out that this nationalistic movement was not without problems. By removing themselves from the European scientific circles, the American scientists were forced to limit themselves to specific regions or a few taxa. The more expansive works took decades to complete, if they were completed at all. Many of Nuttall's discoveries were never published, and both Wilson's *American Ornithology* and Say's *American Entomology* ended unfinished. Popular species, like flowering plants, birds, and mollusks, garnered much attention, while other groups were essentially ignored. Often works were rushed, as competing naturalists tried to beat their rivals to publication, resulting in poor and confusing descriptions. Some, even prominent, naturalists stooped to theft or hoaxing in their interactions with others.

Pauly suggested that the fundamental problem was "a lack of shared values and mutual trust," which was foundational for the European aristocrats who guided their countries' early scientific endeavors. "It was this lack of trust among American naturalists that limited projects to those that could be completed by individuals or, in the usual mode of premodern production, by a family" (Pauly 2000). Individual efforts were then focused, not on the broad surveying of America's species, but on showcasing species of interest to upper-class consumers: colorful birds, collectible shells, and plants for the garden.

The nineteenth century started out well, as the Lewis and

Clark expedition returned from their continental journey in 1806. To this point, the only other explorer to intentionally cross North America was Alexander Mackenzie (Bart 1999). The most exotic specimens from Lewis and Clark's *Corps of Discovery* were placed in Peale's Philadelphia museum. While the leaders of this expedition had received some basic scientific instruction before setting out, they did not include a biologist in their party. It was not until the Long expedition in 1919 that a zoologist, Thomas Say, reached the Rockies.

As educational opportunities for Americans increased in the 1800s, natural history arose as an avocational interest within the general public. Natural history societies and universities sponsored lectures and lyceums—the entertainment equivalent of today's television and movies. Benson (1988) noted, "The popularity of natural history in both countries centered about its perceived moral and practical benefits. 'A good naturalist can not be a bad man' was a conviction shared on both shores of the Atlantic." This moral justification gradually slipped away as commercial ventures expanded the field: book publishing, natural history museums, and natural history collections.

Benson observed that the private natural history museums, many of which were franchises of Peale's Philadelphia museum, were meant to be both educational and entertaining. Sensational exhibits were popular and profitable. Periodicals also served to popularize natural history, accompanied by advertising for specimen dealers like Ward's Natural History Establishment. "The continued popularity of these publications and economic viability of natural history businesses to the end of the century underscores the widespread nature of popular natural history. Again, the target was the avocational naturalist who engaged in natural history primarily for personal pleasure rather than professional gain" (Benson 1988).

Still, up until the 1850s, there were only spurts of true exploration in North America. Welsh explorer David Thompson explored western North America during the first decades. German Prince Alexander Philipp Maximilian arrived in 1832 (Evans 1993), exploring and hunting, finally publishing *Travels in the Interior of North America*. One critical figure emerged in 1850, however, energizing

exploration and discovery. This was Spencer Fullerton Baird, hired as an assistant to Smithsonian director Joseph Henry (Benson 1988).

Baird's enthusiasm for acquiring specimens for the national museum was furthered by his willingness to utilize government employees. Every geographical survey team sent out, whether army, navy, or railroad, was commissioned to send plants and animals back to Washington. Army officers stationed out West proved valuable, especially Army doctors who had scientific training. Those familiar with North American wildlife will recognize names among such army officers: Darius Nash Couch, Elliott Coues, Edgar Mearns, John Charles Frémont, John W. Gunnison, Samuel Woodhouse, William Alexander Hammond, Charles Bendire, Adolphus Lewis Heermann (Evans 1993).

Baird encouraged amateurs and professionals alike to contribute to the Smithsonian. Several Eastern college professors—O. C. Marsh, Asa Gray, William Libbey, and F. H. Snow—vacationed out West and supplied Baird with summer collections (Ewan 1950). He corresponded with self-taught naturalists like Gideon Lincecum, "who gathered fossils, plants, and ants around his residence in Texas in the mid-nineteenth century," publishing over two dozen articles in various scientific journals (Godfrey 1999).

There were four major government surveys of the western territories during the period of 1867 to 1879. These "Great Surveys" are known by the names of their directors, King, Hayden, Powell, and Wheeler (Bart 1999). One might suspect that these surveys, which did include professional scientists, would have been perfect for truly in-depth surveying of Western fauna. Amazingly, in at least two of the surveys, the survey zoologists consisted of teen-agers. Robert Ridgway, at seventeen, joined the Geological Exploration of the 40th Parallel (Evans 1993). C. Hart Merriam was zoologist for the Hayden Geological Survey of the West, at the age of sixteen. Certainly, both individuals eventually became prominent in their fields (ornithology and mammalogy, respectively), but they certainly did not have years of experience before setting out on these expeditions.

In any case, looking at the published results of these expeditions (easily found in major university libraries), it is evident that most

collected specimens from these surveys were abundant and easily encountered animals. The survey's other scientists included botanists and paleontologists, who collected the bulk of the natural history specimens. Were these surveys successful in terms of zoological discovery? Yes. Were they sufficient to discover all significant species in the West? No.

It was only in 1866, in fact, that American biologists truly came together in any real collective. Frederick W. Putnam and other naturalists formed a serial, *American Naturalist*, subtitled *A Popular Illustrated Magazine of Natural History* (Pauly 2000). It was intended to be a link between the teachers and professional naturalists, and those who were starting their studies or were merely enthusiastic amateurs. It was not long, however, [1871] before the publication dropped *Popular* from its subtitle.

It was about this time that we see changes in the structure of natural history itself in North America. One event particularly signaled the beginning of such a change—the Morrill Land Grant Act, passed by Congress in 1867. A provision in this Act allowed the government to sell Federal lands to fund and establish new colleges. “The explicit assumption was that through the advancement of science, contributions could be made to the national wealth primarily through industrial applications” (Benson 1988).

More specifically, laboratory science emerged and replaced field studies as the favored model for scientific research. Johns Hopkins University created the first Biological Laboratory in 1876, along with a graduate program, marine research station, and new biological journals. Natural history had a new direction, which was enthusiastically pursued by other colleges and universities. “Natural history remained alive and well, primarily within museums. Academic biology emerged as a byproduct of the new research objectives and research methods in natural history; the new mission for graduate education in science; the importation of European ideals, techniques, and research questions to budding research institutions; and the more secular and utilitarian attitude toward science at century's end” (Benson 1988).

This change in venue was accompanied by a shift in social structure. Amateurs were not immediately replaced by professionals, but neither were they encouraged to become professionals.

As laboratory science advanced, those fields which were still in the "field collecting" stage were often overshadowed. Ornithology "lagged behind most other disciplines in its academization, presumably because most professionals still focused completely on collecting and describing specimens and did not establish graduate programs until the early twentieth century" (Godfrey 1999). Merriam claimed as late as the May 14, 1897, issue of *Science* that "mammalogy is yet in its infancy."

Once specialization became a focus of academic research, and students flocked to colleges and universities, it was not long before amateurs found themselves outside mainstream science. Museums also became more academic, relying less on the sensational displays of Peale's era. The latter decades of the nineteenth century saw the formation of several large museums: the American Museum of Natural History in 1869; Chicago's Field Museum in 1893; the Carnegie Museum in 1895 (Barrow 2000).

Two further events emerged at the end of the nineteenth century—the rapid formation of specialized scientific societies and government involvement in natural history studies. Barrow (2000) noted the enthusiasm for scientific societies following the Civil War—"an average of about fifteen per decade being established in the forty years before the war and sixty-four per decade in the forty years after it." The American Ornithologist's Union, as one example, was created in 1883, with the objectives of discovering the distribution of American birds, exploring the mysteries of migration, and examining the consequences of an introduced species—the English sparrow (Cameron 1929). Amateurs continued to be involved in some projects, especially in filling out questionnaires regarding bird migration routes.

The AOU convinced the U. S. government to set up research in economic ornithology in 1885, primarily to study bird predation on insect pests. First placed under the Division of Entomology, these studies were moved to a separate Division of Economic Ornithology and Mammalogy in 1886, under its first Chief, Dr. C. Hart Merriam. Merriam headed two lines of inquiry—biological distribution studies and economic relationships between wildlife and agriculture. Merriam's argument was that "the mapping of faunal and floral areas in the study of the distribution of species,

which was basically, of course, purely naturalistic work, would be of benefit to the farmer by showing him the boundaries of the areas fitted by nature for the growth of certain crops and the support of certain breeds of stock" (Cameron 1929).

Such arguments were necessary due to slowing Congressional appropriations for biological study. Many naturalists were given dead-end jobs as the enthusiasm for the Gilded Age's autonomous explorations died and politicians questioned their necessity. Baird died in 1887, and his successor as Director at the National Museum of the Smithsonian, George Brown Goode, was a fish culturist under orders to emphasize hatchery work and fish research rather than general scientific exploration (Pauly 2000). Successful negotiation of bureaucratic nettles required scientists to focus on well-known problems linked to influential lobbyists. While Merriam continued to send out biological surveys to Western "life zones," it became evident by the end of the century that Washington was no longer the leader in scientific exploration. In 1896, the survey work was once again transferred to the Division of Biological Survey.

But what of the amateurs? During the latter decades of the nineteenth century, as the academics focused on specialization, the amateurs commercialized. Barrow (2000) pointed to vast economic and social changes between 1860 and 1900, as the population doubled, GNP quadrupled, and advances in technology made it easier to publish and distribute literature. Increased leisure time for the middle-class and "the wide diffusion of romanticism . . . provided an intellectual framework both for critiquing the new urban-industrial order as well as for appreciating the aesthetic and spiritual values associated with wild nature and the outdoors" (Barrow 2000).

This increased interest in natural history led to an increase in job seekers wanting to pursue a career in the sciences. The academic community was unable to afford or absorb all of these potential naturalists, so hopefuls became entrepreneurs as they found a way to make a living and pursue their interests at the same time. Thus began the reign of the natural history specimen dealer. There had always been a few individuals who collected specimens for sale to museums and private collectors, but the burst of activity during this period was phenomenal. "The individuals who created these enterprises simultaneously helped to promote and hoped

to profit from the burgeoning interest in both scientific and popular specimen collecting. At a time when other employment and educational prospects in natural history were severely limited, hundreds of dealers across the nation provided encouragement, specimens, publication outlets, training opportunities, and jobs for naturalists of all motivations and levels of experience" (Barrow 2000). Such notables as Henry W. Bates and Alfred Russel Wallace supported themselves this way before turning to academic pursuits. These dealers were foundational for the collections of numerous museums, at a time when mounting a full-fledged expedition for specimens would have been expensive and time-consuming.

As the new century dawned, professional interest in natural history became much more pragmatic. As H. W. Henshaw noted in a *National Geographic Magazine* editorial, "The pursuit of science solely for its own sake, however commendable it may be, is not the spirit that animates our government in its support of scientific research. In its aims and ambitions this is a practical age" (Cameron 1929). Agriculture and disease-prevention were the main concerns—especially a rabies epidemic in coyotes and booming rodent populations.

It seems a shame to end the history of zoological discovery in North America at the early 1900s, but honestly, what happened after that time? There have been discoveries of rodents and insectivores, thousands of invertebrates, and subspecies of larger vertebrates. Most of the subspecies of canines, felines, and ursines described during the early part of the twentieth century have been discarded as our knowledge of variation within species expanded.

Appendix 2 lists currently recognized North American terrestrial mammals and their description dates. We glimpse discovery patterns as explorers moved further into North American territory. But are known discoveries an accurate gauge to what is actually in North America? I am compelled to argue that history is clear—there have been no systematic large-scale explorations of North America's wilderness. Probings here, excursions there, and we think we have the complete picture? There are too many stretches of uninhabited or sparsely inhabited land for anyone to be adamant about the non-existence of large unknown species in North America. Aerial mapping and sporadic ventures do not begin to unveil the opportunities for biological discovery.

Why Cryptozoology?

There are three basic reasons why biological species remain hidden. First, species salient enough to be recognized ethnozoologically may have physical or phenological characteristics which make chance discoveries improbable. Second, geography, whether remote or difficult to access, can restrict human encounters with a species. Third, traditional scientific methodologies (*e.g.*, random surveys using taxon-specific techniques) contain blind spots which overlook some animal groups or are unprepared for the rigors involved in locating and confirming the presence and identity of an unconventional species. Traditional methodology itself is often influenced by professional interest. A lack of interest engenders a lower probability of creative methodology.

Let's look separately at chance encounters, general surveys, and what actually draws a professional scientist's interest.

Chance encounters make the best stories in zoological discovery, but are not frequent enough to be relied upon for systematic completeness. Examples of fortuitous convergences with unknown species include first contact with both living coelacanths, *Latimeria chalumnae* and *Latimeria menadoensis*. Courtenay-Latimer's (1989) narrative is a fascinating story of how difficult it was to get serious scientific attention for the first coelacanth, once she recognized the prize she was given. The Indonesian coelacanth was identified, then lost, as zoologist Mark Erdmann did not immediately realize that the fish market find was outside the known range for coelacanths (Ellis 2001). Other examples can be gleaned from sources such as Dr. Karl Shuker's (1993) *The Lost Ark: New & Rediscovered Animals of the 20th Century*. In any case, chance itself is not sufficient for discovery. Other elements are necessary—ability to recognize the discovery, inclination to act upon the discovery, and willingness to provide the necessary evidence to competent individuals for examination and confirmation.

I am tempted to suggest that we should detect a general pattern in chance encounters and resulting zoological discovery. In other words, for every encounter that results in a specimen, or at least sufficient physical evidence to distinguish and confirm a new biological species, there should be a larger number of encounters

which only provide circumstantial non-confirmatory evidence. After all, chance discovery is still a process made up of a number of steps, and fortuitous encounters do not guarantee that the end result will be satisfactory. What ratio this might be [1 out of 10 encounters, 1 out of 100, etc.] does not immediately suggest itself. This would probably only be calculable in hindsight. Let's say, for example, the biologists responsible for discovering the large mammals (saola, muntjacs, etc.) of the Annamite Mountain region had kept track of the various ethnoknown species they heard about from the locals. After matching the known species to their respective ethnoknowns, they would have been left with unidentified ethnoknowns. What percentage of those ethnoknowns panned out? As Dr. Charles Paxton pointed out to me, there are too many widely varying factors for differing species to allow good predictions via statistical modeling, but I do think simple ratios like this might be useful for something.

There are any number of biodiversity survey methods available for zoologists, but most are specific to the animal forms being surveyed. Surveys are based on probability. Relative abundance correlates to frequency of encounters, but scientists must also consider length of study time, ecological factors, specimen collection methods, trap placement, and other factors when contemplating the overall biodiversity in any given region. For example, in one survey (Caro, *et al.*, 2001), "Trapping success of researchers and densities of small mammals varied greatly between sites. Although number of species increased with researcher effort, the most extensively studied site did not encompass all mammalian diversity in the region. To obtain a representative mammalian inventory, effort should focus on sampling mammalian fauna at multiple sites, rather than increasing time at 1 site." Even when biologists integrate targeted-search methodologies, as when Schaller (1988) asked Laotian hunters about the species they hunted, there are significant cultural factors which could hide an ethnoknown species. It may be have no economic value, and so ignored, or may be given mystical status and feared too much for any useful data to be collected.

There appear to be three deciding elements which determine the paths for professional scientists to investigate. First, there is

observed phenomena. These are events or objects which stimulate questions about themselves. Second, there is logic and rational thinking. This is where one can follow lines of reasoning to points where questions assert themselves. Constraining these questions, or rather the lines of theorizing and implementation of experiments, is a third factor—what Holton (1981) referred to as *themata*. Themata are those “fundamental preconceptions” that are distinct from observed phenomena or logical proofs. For example, any field of study may have more than one school of thought concerning specific points. Paleontologists argue about what caused the mass extinctions of the dinosaurs, anthropologists debate the age of man, etc. Each school of thought incorporates its own themata. These assumptions help formulate specific lines of inquiry, but they can also restrain creative thinking.

There is a wide range of interest among professional biologists toward cryptozoological subjects, from disinterest to mild interest to enthusiasm. Themata influences this. Krantz (1983) noted that, when showing plaster castings of alleged Bigfoot tracks, “In the fields of physical anthropology and zoology, most of the responses have ranged from mild interest to flat denial that they could be real. Among fingerprint experts and pathologists, the responses have ranged from mild interest to enthusiastic acceptance.”

In any case, it should be obvious by now that zoological discovery cannot rely on chance to complete our knowledge of biodiversity. If you don’t look, chances are, you won’t find it. Effort must be made, with a serious specific methodology and critical analysis of results and procedures.

Are Cryptids Worth the Effort to Locate?

I ask this question because it is so often implied by biologists who are asked by the media what they think of cryptozoology. I read one newspaper article where a marine biologist in British Columbia questioned why so much effort was given to chasing Ogopogo or Caddy when there were so many small species that we know for certain have yet to be discovered. We need to consider what is really being asked. Are some species more valuable than others?

The short answer is yes. Of course, the politically correct answer is that "all species are important." Without debating intrinsic values of a genotype or phenotype (which obviously cannot be defined or measured), I must point out that there are very distinct and disparate cultural values within any range of species. Fleas have less conservation appeal than tigers. Monarch butterflies are released at weddings, not grasshoppers. Does this mean that fleas and grasshoppers have no ecological importance? Of course not. But science cannot bunker itself against culture. The concept of *ethnoknown* in cryptozoology means that an individual or a community has communicated their awareness of an anomalous animal. That animal requires an explanation—it may or may not be an unknown species, but science has a cultural responsibility to investigate or to at least provide support to those who choose to do so.

We also need to understand that the search for and identification of small species like arachnids, insects, and other invertebrates requires far greater academic knowledge and specialized equipment than the typical layperson has at hand. If it were a simple matter, any hobbyist would be able to name new species regularly—there is certainly no shortage of unrecognized invertebrates in North America. Many such species, however, require microscopic examination to determine the distinguishing characters. Numerous spiders and centipedes, for example, can only be differentiated by the structural morphology of the male reproductive organs. In order to determine whether such a species is new, one must thoroughly examine the published historical literature by tracking down obscure papers in scientific journals from around the world. Type specimens need to be examined—a time-consuming and costly endeavor if you must travel to the necessary museums. This assumes, of course, that they will allow a layperson to examine the specimens. Beyond this, the systematics of many groups requires far more attention than a single researcher can provide. I have a personal interest in myriapods. Their taxonomy is befuddled in several areas due to the inadequacy of current knowledge of many millipede and centipede genera. One myriapod biologist noted on an email discussion list that it doesn't look like the taxonomic entanglements will be unraveled anytime soon, as fewer students are moving into systematics. There just isn't any money in it.

The idea that laypersons, then, should stop the search for mystery animals is little more than sour grapes. What zoologist wouldn't savor the opportunity to search for and describe a culturally significant species, if they knew with certainty that the search would be successful? Yes, a professional biologist can achieve personal satisfaction by sifting through snail shells or digging up nematodes. This is rarely, however, going to capture the interest and attention of the typical layperson, and there is no reason to deride those who choose another path. A more productive outlook would be for professional biologists to lend their ears to serious investigators, and provide advice and suggestions so that amateurs can adequately critique their own methods and results.

Who should investigate cryptids?

Amateur researchers are in a better position to investigate controversial cryptids. The cost/benefit ratio is too low for commercial application, so the likelihood of professional biologists receiving grant money for such projects is low. I am only aware of a few cases where major foundations have provided grants for cryptozoological research, and they tend to be small grants given to experienced wildlife investigators.

Amateurs and professionals often have differing motivations for projects. A professional may be required to seek commercial opportunities, or may need to focus on academic projects for publication. Wilson (2000) gave two primary motivations for the *cognitive interest* of a professional scientist. The first is pragmatic interest, where the researcher follows those paths which will lead to commercial use or, I assume, academic achievement. Wilson's second motivating factor, he calls *idle curiosity*. Really, is that it? Is scientific impetus engendered only by commercialism, peer pressure, and idle curiosity?

Wilson missed (ignored?) several motivating factors for investigation. Cultural impetus is, as I have stated, a good motivator for scientific pursuit. A concern for the environment at large, including those elements which may yet be undiscovered, can also lead to research. At least one group of professional biologists is attempting

to describe all known species (Allspecies.org), which I suspect is spurred not only by environmental concern, but for a sense of completeness. A personal desire for discovery may motivate some individuals, as they look for a way to make their mark on science. I would not dismiss all of this as just "idle" curiosity.

Frankly, I don't care what motivates an individual researcher, amateur or professional, so long as they remain ethical in their dealings with others. Certainly, no one is going to get rich or famous by discovering Bigfoot or some other cryptid. The toy manufacturers might make a few bucks, but you can't copyright or trademark a zoological discovery. Fame is fleeting—how many zoologists who have discovered new species are well-known to the general public? Unless the discoverer also writes or co-writes the formal description, it is likely that only the authors will be cited in future scientific papers.

Freeman J. Dyson (2002), who reviewed amateur astronomer Timothy Ferris' book, *Seeing in the Dark: How Backyard Stargazers Are Probing Deep Space and Guarding Earth from Interplanetary Peril*, noted that a science goes through three developmental phases. The Baconian phase is about exploration. Amateurs can readily make their mark by working alone or with professionals, as they rummage through new ideas and investigate the breadth and scope of the developing science. Specialists emerge from the Cartesian phase, and amateurs are often overlooked as detailed analysis and theorizing plays a larger role. The third phase creates an equilibrium of sorts, as advanced technology breaches the boundary between professional and amateur. The personal computer and the Internet bring technical discussion and specialized information directly to the nonprofessional. The amateur scientist-investigator should strive to build on these opportunities, enhancing the reputation of amateur investigation, rather than just blaming the professional community for maintaining scientific standards.

If I argue that amateur investigators should carry the lead investigative role in cryptozoology at present, however, I do not imply that professional biologists should have no role at all. Supportive roles in the form of education, critical evaluation of techniques, analyzing results, and pointing out problems are necessary if cryptozoology is to remain scientific. The average layperson has few

means of keeping up with the rapid flow of information developing in zoology, genetics, and other relevant fields. Professional biologists also have opportunity to use cryptozoological methodology with less controversial mystery animals. Publication of research, especially those resulting in new species discoveries, promotes cryptozoology as a justifiable methodology.

CHAPTER SIX

The Methodology of Cryptozoology

A methodology is a series of organized actions undertaken to achieve a particular goal. In a cryptozoological investigation, our goal is to determine whether reports of mystery animals have a valid biological basis in an as-yet unidentified species. It is important to recognize what makes up a cryptozoological investigation, and to understand that each action is only one step in an ongoing process. Without understanding that a cryptozoological investigation is not, for example, folklore study, a researcher may come to conclusions that are not justified under a biological perspective.

The overall process of cryptozoology is straightforward:

- 1) Recognize cryptid
- 2) Gather information on cryptid along with pertinent environmental and ecological characters
- 3) Determine a means of obtaining sufficient physical evidence to confirm or refute the existence of a previously unknown biological species

First, we determine whether a specific report is in fact cryptozoological. Remember, the term *cryptid* is categorical. It does not imply that a given sighting report must be based on a living animal, and it does not imply that if in fact it is zoological, it must be an unknown species. It merely denotes that the report *may* be of an animal, and that animal *may* be unidentified. Before we can determine whether an account is cryptozoological, we first investigate the possibility that the sighting is a hoax, misidentification, or social fabrication. If no such factors can be determined, the subject is labeled a cryptid. This does not mean

that the cryptid will not be shown to be a misidentification or hoax in the future—but a preliminary filter is necessary to weed out obvious errors.

We take steps to identify reports of rare or little-known species. Just as a professional scientist is responsible for reviewing all related taxa to ensure that a new species is not redundant, a cryptozoological investigator should review extant known fauna for potential identification of a mystery animal. If you are investigating a report of a strange whale, you should familiarize yourself with the known cetaceans (which include a number of little-known species) before suggesting that an unknown species is involved. I recommend several experienced investigators be consulted when you encounter a potential new cryptid, as there are a number of subtle factors which contribute to the misidentification of known species.

Once a cryptid is recognized, several streams of data should be pursued. First, solicit and gather any and all reports of similar sightings within the region. Second, compile information on the habitat and prevailing environmental conditions where the sightings occurred. If the description of the cryptid suggests similarities to specific animal groups, collect behavioral, anatomical, and ecological notes on those species.

The final step in a cryptozoological investigation is to analyze the gathered information and use it to devise and implement a means to obtain sufficient physical evidence to confirm or refute the cryptid as a new biological species. This is, obviously, the most difficult phase in an investigation. If a cryptid is confirmed, the physical evidence should then be sufficient for an indisputable professional scientific description of the species.

At present, most cryptozoology enthusiasts solicit and collect sighting reports. They rarely collect evidence which would be sufficient for confirmation or refutation. Even the rising use of photographic evidence collection through triggered camera traps is insufficient, given the rapidly increasing technology of digital manipulation which has improved the quality of hoaxing. There are some small groups which are actively searching for physical evidence—hopefully that trend grows. Sighting reports themselves will never provide sufficient evidence to differentiate and describe an unknown biological species.

Still, this should not prevent anyone from collecting reports. We just need to understand that it is only one step in cryptozoology, and that further steps are necessary in order to finish an investigation. I suggest that those who actively solicit reports partner with individuals in active field-work. Many people are not able to spend a great deal of time in the field, but may be willing to interview witnesses or do historical or bibliographic research. Organizing these efforts within a cryptozoological methodology is important—collecting reports should not be like stamp collecting. Reports must be used to have value. There are too many cases where reports were hoarded in the 1970s and 1980s (SITU, Centerforce, etc.), rarely disseminated to other investigators, and which are no longer available for analysis. Active publishing, or at least sharing reports within a trusted small research team, should be a fundamental objective for sighting collection.

Back to the Beginning

So, where do we begin? There are two options. We can start our investigation with a recognized cryptid, or we can search for potential new cryptids. There are literally hundreds of reported cryptids around the globe. Many were only reported once or twice in distant parts of the world, making serious investigation unlikely. Several of the well-known cryptids here in North America, however, can be investigated fairly easily if you live within their purported ranges [folk ranges?]. There are several regions where interesting sightings have had little or no serious inquiry.

Let's consider the potential for unrecognized cryptids. Is it still possible to find reports of legitimate mystery animals which have not been published in the cryptozoological literature? Absolutely. Despite the vigorous wide-ranging efforts of investigators like Dr. Karl Shuker and Loren Coleman, you can still run across the odd account or encounter with a brand new cryptid. I've been fortunate enough to locate a few such beasts, but it isn't easy. In order to be effective in data mining of this type, you must be able to recognize inconsistencies and aberrant morphology in species descriptions. This in turn requires a strong knowledge of zoo-

logical systematics and *normal* animal characteristics. Specialization in particular types of cryptids should lead to specific investigatory searches. Personally, I'm familiar with the snakes of North America, which allowed me to recognize the distinctive unknown nature of Charles Lummis' horned viper of New Mexico. I would not, however, be very good at recognizing certain other cryptids. While browsing through a local university library, I skimmed through the narrative of an Antarctic expedition and came across an interesting quote on misidentifications at sea, noted earlier in this text. Only later, while browsing over a checklist of mystery animals, did I realize that that same book mentioned a southern narwhal, still a mystery today. I'm glad somebody noticed it, as I would never have recognized the significance myself. I would need to study a few marine mammalogy texts before I would be comfortable searching for cryptozoological whales.

There are a few ways to start looking for potential new cryptids. One is to locate a large region with plenty of habitat and little or no history of cryptozoological reports. Even better, locate territory with few zoological studies in general. There are large tracts of land in North America where zoological studies have been patchy at best. After you locate your target region, visit it and start asking around. Have there been any stories of unusual animals? What are the strangest critters seen by the local hunters or farmers? Use the answers as starting points when talking to others. How far you get will be determined by the locals' willingness to talk. In some areas, there are cultural barriers and suspicion of strangers, so it helps to be part of the community or have strong contacts within the region. It may take a while before you hear any significant reports, so you can't expect success in just a weekend or two. When you do get reports, don't be surprised if most stories are based on feral dogs or other known species.

Literature mining is another way to locate new cryptids. This is just what it sounds like. You find a nice large library (university libraries are usually good for this) and skim through their books on travelogues, country histories, and natural history. Older books are especially good for locating reports of strange creatures, but the further back in time you go, the more likely they are just poorly-characterized descriptions of known species. The best

books tend to be from the late 1800s and early 1900s, when at least some semblance of systematic zoology was observed. Scientific expeditions, diplomatic travels, and military excursions all provided an excuse for authors to narrate their journeys to distant lands. I should note that most cryptozoological data mining has been in English language texts. If you are able to read French, German, Italian, or other languages, there is greater opportunity for finding new reports of cryptids. Personally, I would like to see someone go through the 1700s-1800s texts written by French trappers, merchants, and priests from across North America, as most have never been translated into English.

Once you have located what you think may be a new cryptid, examine it carefully. Are there internal inconsistencies in the story that suggest it is fictitious? How specific are the given characteristics, and are they based on physical scrutiny or second-hand accounts? Does the mystery animal have characteristics which fit within a known group of animals (felines, primates, lizards, etc.)? If so, what, if anything, specifically sets it apart from known species? What events surround the report which might suggest that it was a prank or hoax? What environmental conditions might have contributed to a misidentification of a known species?

While rumors can lead to substantial reports, it is virtually impossible to conduct an investigation purely on third-person stories. It is far too easy for stories to pass from one person to the next, with major elements changing at each telling, for hearsay to be of any serious use. Original witness accounts should be collected, whether from personal interviews or published reports. Once you ascertain that there are no obvious errors in identification or judgment, you can look at your new mystery animal as a cryptid.

Rather than searching for new cryptids, you might prefer hunting the old ones. The checklists by Dr. Bernard Heuvelmans (1986) and Dr. Karl Shuker (1998), and the two-volume reference set by George M. Eberhart (2002), are good places to start. Look until you find sightings published in your region. If there is one report, there are usually more to be unearthed. Perseverance is essential.

Information Gathering

We have discussed the way people see and organize the natural world around them. Searching for information on cryptids from locals [a generic term I'll use for people groups, whether they inhabit rural Indiana or the Matto Grosso] requires approaching individuals with a close relationship to the outdoors, whether due to their activities (hunting, fishing, hiking, outdoor occupations) or to the rural nature of their residence. While it is true that we sometimes receive reports when a vacationing urbanite randomly encounters a strange creature, the best reports will come from those who consistently live, work, or play around potential sighting locations. These should be your primary target for report solicitation.

The best reports will come from visiting the area of interest and talking to any locals willing to discuss the subject. Patience and persistence, along with a nonjudgmental attitude, are absolutely necessary. Allow them to discuss known wildlife first—this gives a basic marker for their general knowledge of animals. You can trigger a comment by asking about a specific cryptid, but be aware that local ethnozoology is not always biologically accurate. Their *panther* may be a black feline, or a mountain lion, or something else altogether. Ask questions to make certain you know what they mean when they use vernacular names. Be careful not to assume that you know what they mean. Note any unusual vernaculars, and test them with other local individuals. If a community in south-central Tennessee is aware of "hill people," does everyone have the same concept of what the vernacular means?

Unfortunately, time and funding often limit traveling to distant regions. You can, however, solicit sighting reports remotely. One time-honored tradition, and often an effective one, is to use local newspapers. There are hundreds of city, town, county, and suburban newspapers in North America. You can find addresses or URLs in online newspaper directories. Some newspapers will publish a brief well-written letter to the editor which asks readers for information on a specific mystery animal. Letters which fish for any and all cryptid reports tend to receive few replies, if any. A reader may need a focused query to jog their memory of a sighting, or they may need to see that you have prior knowledge of a particu-

lar cryptid before they entrust you with their personal account. Don't just mail the letter to one newspaper. Send letters to several newspapers within the same region, making sure to personalize each one. Some newspapers, especially those from large cities, will not accept letters of this nature, so you might consider purchasing a small classified advertisement if the city is directly within the suspected range of the mystery animal. Most newspapers require you to provide your home phone number and mailing address, so that they can verify you are not engaged in a scam. I would not suggest you include your home address in the letter for publication, but make certain that you offer at least a post office box in addition to an email address.

Solicitation through newspapers has the advantage of reaching hundreds or thousands of potential witnesses. You will have to analyze each report critically, just as you would a report from any other source, but there is no truth to the idea that this will only solicit crackpot reports or hoaxes. Occasionally, a newspaper reporter, or even a television reporter, will run across your letter and inquire with the intent of finding a good story. With the right reporter, this could easily expand your potential coverage, but be careful. I have seen media coverage resulting in both positive and negative situations. No matter what you do, never give information to the media which your witnesses have asked you to keep private, or give information which could be embarrassing to your witnesses.

If you have a specific area that you want to target, try direct mailing. While this can get expensive, it may work successfully in those areas where you already have sighting reports. Just write a short polite letter detailing your interest in the specific animal reports and include a one-page questionnaire with a self-addressed stamped envelope (SASE). I have done this with specific roads in rural areas where I know sightings have been reported in the past.

One important method for soliciting reports is to network with individuals who are in a position to hear stories about strange animals. Outfitters, hunters, guides, naturalists, historians, journalists, folklorists, and law enforcement personnel are just a few possibilities. Many such professionals can be located online, but personal interaction is the best way to get cooperation.

You can also set up small websites which specifically focus on a given cryptid or region. With the proper keyword setup and links from the major search engines, cryptozoological sites, and regional sites, you can solicit sighting reports directly from your website. This has been helpful for some, even with very basic websites. Obviously, care needs to be taken when reviewing any sightings, but Internet reports have a stigma of being less reliable than other venues. I have received what I consider to be reliable reports from web-traffic to my site, and have received others that are much less trustworthy. There have been several Internet-based cases [*e.g.*, the Ozark Howler] where a skeptic has attempted to hoax cryptozoological investigators.

For historical reports, period newspapers are a good resource. Historians and folklorists may mention local legends and tales in their books and journals, but the original newspaper accounts are likely to be more informative. Many states permanently archived historical newspapers on microfilm. You can search through a university library's online catalog to determine whether they have these microfilm collections. Personally, I have found the State Library of Pennsylvania's newspaper microfilm collection very useful in tracking down historical accounts. Newspapers hoaxes occurred regularly in the past, as editors used them to entertain or bewilder their readers, but this should not be taken as *all* newspaper articles being probable hoaxes.

When a written account indicates that law enforcement personnel were involved in a sighting, you should ask for a copy of their investigation report. Unfortunately, after 3-5 years, many law enforcement agencies cull non-essential files, so accident and investigation reports are not always available when you find out about them. It can help to be creative, though. I had heard that a pair of Maryland investigators were unsuccessful in acquiring the accident report for a 1970s purported Bigfoot/auto collision from the Maryland State Police. While the barracks had, in fact, eventually gotten rid of the files, the State crime laboratory kept a report, as hair samples had been analyzed. A letter sent to the crime lab was all that was required to get a copy of that analysis report. Unfortunately, the hair samples themselves had been returned to the barracks, and discarded with the rest of the files.

For some U.S. agencies, you may need to couch your request as a Freedom of Information Act (FOIA) query. It is not always fruitful, but I have gotten some interesting material by using it. Anyone may request specific information from the military, FBI, or other federal government agency, office, department, or bureau. The information requested must be for something on record (books, maps, papers, or photos). Requests can't be made for physical objects, codes, software, or personal records. The record must exist, as the government is not obligated to create a new record just for your request. The information requested must be in the public interest, in that it provides information about the performance of the government's duties. The Act does not authorize fishing expeditions. Some specific detail of the record must be given by the requester: title, index citation, subject area, date of record, originator, or description of the circumstances which resulted in the record's creation. A request must reasonably describe the record requested. For complete details, see *A Citizen's Guide on Using the Freedom of Information Act and the Privacy Act of 1974 to Request Government Records* (House Committee 1991). You may be asked to pay a fee for copying costs, but these are usually waived for smaller requests.

This may seem complicated, but it just means that you can't send a FOIA request to the U.S. Army asking them to send you a copy of all Bigfoot sightings by military personnel. If you know of a possible sighting by a soldier on a training mission in Alaska, you can send a request to the appropriate Alaskan base, asking for a copy of the record of that sighting, giving them the details that you are aware of. You may or may not receive a positive responses, but you will receive letters from the appropriate FOIA officers.

You may not be able to request records from some local or state government agencies, but many states have "open record" laws. Check your library's reference section to see if they are applicable to your area.

No matter where you request the information, politeness is the best way to achieve success. Bureaucratic systems require a great deal of patience and persistence. Just remember that FOIA officers are willing to help you if you treat them as fellow human beings, and not like mindless government automatons.

The Report Form

There are a number of basic questions that must be asked to fill in details about any encounter with a mystery animal. Even if someone emails a sighting report to you, go back and ask the questions. Without a proper understanding of what actually took place, it is too easy for a misidentification to be overlooked. Some questions may not be answered, but try to get as broad a picture as possible.

Names and Contact Information for the Witnesses

Make certain you have complete records so that you can go back and ask further questions as they arise. Personally, I do not release this information to the general public. I am not a newspaper reporter, and have no compulsory mandate to provide this to anyone and everyone. In most cases, the witnesses want to remain confidential. I have seen several cases where breaches of privacy and common sense by incompetent researchers have ruined the potential for long-term relationships with land-owners and witnesses. I let witnesses know that I will only release contact information to a reliable experienced investigator. In many cases I am already working with a small group of investigators, so the information is not merely hoarded. The main concern about witness confidentiality is "how do other investigators know it isn't a hoax, if they can't check up on it?" If I have done my job correctly, the rest of the data gathered should provide a means of exposing obvious hoaxes or misidentifications.

No report, however well investigated, can ever be said to be 100% reliable against the possibility of falsity. Too many investigators focus their efforts on forensic-style examinations of a few specific sightings. This makes little sense from a cryptozoological standpoint. The data from past encounters will never provide sufficient physical evidence to confirm and describe a new species. Given that we can never, and should never, place absolute certainty on any sighting report, merely pointing out the obvious does little to determine whether or not an unknown creature exists.

Date report form is filled out

This allows us to keep track of the amount of time between event and reporting. We must recognize that over time, details can become blurry or mistaken.

Date of incident

We are looking for the closest approximate date of the sighting. If it occurred decades in the past, we should, at minimum, try to determine the month or season.

Time of day incident occurred

Time of day not only is important in determining prime hours for potential field work, but may have also influenced potential mistakes in identification.

Weather conditions at time of incident

We don't need to know the dewpoint or phase of the moon, but basic weather conditions should be noted. Temperature [hot, cold, mild] could be helpful.

Location of incident

Be as specific and detailed as possible. It really does help to visit the site and get a feel for the habitat. An on-site visit may point out reasons to consider the sighting a misidentification. Obviously, when dealing with private land, make certain you have permission to visit.

Description of area

This is one of the most significant points. You should visit the site to determine the answers for yourself. What kind of habitat is it? What forms of vegetation are apparent? What is the topology of the area? How populated is it? Where are the closest roads?

Where are the nearest bodies of water? Are there any known caves or abandoned shelters in the area?

Vegetation is important in determining which species of animals occupy the area. Learn to identify the primary food-source plants, and look for signs of other animal life. An oak-maple forest, for example, will have higher biodiversity than a pine forest.

Description, if an animal was sighted

We want to know as many details as can be remembered, without triggering false memories. If at all possible, a sketch should be made by the witness. The form, coloration, and approximate dimensions are especially important. Along with the dimensions, (height and length), did the witness have good reason to pick those measurements? We have to be careful, because it is very easy for animals to be exaggerated in size due to surprise, fear, or excitement. A large bird in the sky, for example, can be very difficult to measure. How did the animal move? What was its behavior while being watched? Did it make any sounds? Was there any distinctive odor?

Description of the sighting event

How long was the animal seen? Was it ever aware it was being watched? How far away were the witnesses from the animal, and is there a way to effectively confirm the distance? How many witnesses were there? Note, that with multiple witnesses, it is best to get separate accounts, without them helping each other. While some discussion has probably occurred before they talked to you, they may not have discussed every feature of the encounter.

Was physical evidence found?

We want a full description of any tracks that were found, where they were found, whether they were in a trackway (multiple prints), and where was it headed? Size of tracks should be coupled with length of stride. Obviously, photographs or casts of the tracks would be very useful. If you photograph tracks yourself,

be certain to include a standard-sized object [pen, quarter, dollar bill, ruler] for size reference.

Surrounding circumstances

Are the witnesses aware of anyone else who may have reported seeing the animal, or have they heard of any unusual disturbances with livestock or domestic animals? Have any unusual animal kills been found?

Tools for the Investigator

The most basic resource for any investigator will be the personal library. Depending upon your preferred pursuits, there are dozens, if not hundreds, of cryptozoological or Fortean books and magazines which may point to areas to investigate or allow you to learn from another's investigation. Let's be honest—there is a lot of misinformation, poor speculation, and outright baloney in many books. Develop a critical eye when reading and learn to distinguish between fact and fancy. You should also acquire books on basic zoology and natural history, emphasizing those groups which are more likely to include the cryptids you investigate.

You will need a place to record and organize your data. Computer programs can be useful, but are not absolutely necessary. You can do just as well with a simple journal. Professional biologists are once again advocating journals as a means of recording daily observations and research. You can always transcribe and organize the data separately onto a computer. At the very least, carry a small notepad for ideas that pop into your head when you least expect them.

You will need to create a comprehensive and organized filing system for newspaper articles, journal articles, witness reports, correspondence, and copies of anything else pertinent to your investigations. It adds up after years of research. I know investigators with rooms full of files and books. You should develop a system that lets you quickly access needed facts. Quite a bit of material can be found online and collected on computer disks,

but I don't know of any investigator who has escaped the need for keeping paper files.

Consider getting a tape recorder for personal interviews. While you can just write notes while you are talking, you may wish later you hadn't forgotten to jot something down or overlooked a pertinent fact. Miniature recorders are not too expensive, and can even be used for field work. I picked up an inexpensive parabolic microphone several years ago which can be jacked into a small hand-held tape recorder, allowing me to record wildlife sounds from a good distance.

Maps are the investigator's best friend. There are companies that offer high quality book-format state and county atlases. Some of these are specifically created for the outdoorsman. These show the boundaries of natural areas and parks, and often allow you to see the extent of general habitat regions (*i.e.*, forests, deserts, marshes). Before doing any field work, look over the roads and familiarize yourself with the populated areas. You want to know where you should go in an emergency.

Optical and photographic equipment are always handy. A good-quality sturdy pair of binoculars is useful in field work. Newer models incorporate digital photographic capabilities. Cameras and video cameras should be used to document evidence from varying angles, along with the surrounding habitat. Close-up capability is especially helpful. Motion-sensitive triggered camera traps (*e.g.*, Carthew and Slater 1991) can be used with still and video cameras along potential paths or in association with bait. Just be certain not to place them where vandals or thieves will easily find them. There is a variety of equipment available for night forays—light intensifier scopes, for example, have proven effective in wildlife management field work (King and King 1994). What is important, however, is not so much the equipment you purchase, but your ability to use the tools at hand. I've seen a lot of lousy pictures. Spend the time and effort to practice and learn how to use your equipment effectively in field conditions.

If physical evidence is being collected [hairs, feces], make certain you have a good pair of rubber gloves and sealable plastic bags. Samples can be dried and frozen until you package them off for analysis.

Interviewing

The impression you make on a witness will determine how much you'll get from the interview, so be polite. Not every witness is eager to expose themselves to potential ridicule, so listen carefully and treat requests for confidentiality with respect.

Ask the witness to describe the incident in his/her own words. Find out whether others witnessed it, and to whom the incident was reported. (You can always contact police or wildlife officers for information on their investigations.) If you are conducting the interview in person, ask if you can tape record the conversation.

As the witness relates the sighting, jot down questions that come up, but don't distract the witness while s/he is speaking. After you have the gist of the story, go back and get the details you'll need to fill out your report form. That will create a permanent record of the sighting. If a videotape or photographs were taken by the witness, ask if you can make a copy of them. Don't publish a witness' photograph without their written permission—they do own the copyright. That copyright does not transfer just because they gave you the image. If the sighting occurred locally, have the witness show you where it took place. This should allow you to determine how well the witness estimated distances and dimensions.

Keep most of your questions open-ended, rather than relying on questions that require yes or no. The more the witness talks, the greater the chance they may inadvertently provide details you wouldn't have thought to question. This requires establishing rapport with the witness. One easy way to establish rapport is to determine their sensory position. When they talk, do they use phrases like "I heard," "it felt," "my heart pounded," "I couldn't see," "it looks like," or "it's hard to swallow?" Witnesses usually stay within a particular sensory channel—auditory, visual, or feeling (Rabon 1992). If we pick up on those lingual cues, we can use similar phrases to place ourselves in their channel, making them more comfortable.

Determining witness reliability isn't an easy task. Each witness must be evaluated on their own merits. Yes, listen to everything they say. Even an unreliable witness may tell you something of

value. Just weigh everything carefully. A witness may be prone to error or may be trying to fabricate a hoax. Misidentifications are much more common than outright lies, but there are a few questions to ask yourself while you are conducting an interview.

Does the witness want publicity? (Has the witness already contacted the media?)

Does the witness have any prior knowledge of cryptozoology?

Does the witness seem prone to exaggeration?

Does the witness remain faithful to the story throughout the interview? (Or when telling the story to different people?)

None of these questions prove that a witness cannot be trusted. Shock, pressure, fear of negative publicity, or an active imagination can all color a witness' reaction. Try to understand the witness' point of view. Here is a chance encounter that has brought the witness to a point where he or she must decide "Did I actually see what I thought I saw?" How the witness answers that question is a significant factor in the story that is told.

There is another factor which determines whether a witness gives a truly accurate description of the event. Schacter (2001) noted, "Suggestive questions produce memory distortion by creating source memory problems," as witnesses unconsciously misattribute information from the questions themselves to the actual incident. In other words, if witnesses report a lake monster, it is possible that poorly-worded questions by investigators may cue the witnesses to traits and characteristics which they then incorporate into their story. The witnesses may believe that they are in fact remembering those traits. Investigators should prepare themselves before interviews by making certain that their questions do not include suggestible data or assumptions. Investigators must also remember that outside influences (movies, media, books, websites) can distort a witness' memory over time. Human minds are a great deal more suggestible than we imagine.

Schacter (2001) observed that suggestibility is not the only trick that memory can play on witnesses. Transcience (forgetting

details over time) means that quick observations may lose specifics even if the overall event is remembered. Misattribution comes in when a sense of familiarity dictates a witness' recollection. If some characteristic was expected, the witness may believe they saw it whether they did or not. Or, they may replace details without realizing it. If the witness normally goes out on the lake at 2 p.m., but on the day of a strange animal sighting goes out earlier, the witness may mistakenly claim that the sighting occurred after 2 p.m. just because it was a more familiar time of day. Misattribution is probably responsible for many individuals who, having read about the ongoing search for the infamous "Thunderbird" photo, later begin to believe that they actually saw it at one point. Bias is another memory trick, as strong influences after-the-fact (*e.g.*, hindsight, stereotypes) distort the witness' perception of the event.

There are a few techniques that can be used to spot memory construction. When actually remembering visual or auditory events, our eyes tend to move to our left, while if we are fabricating something, we tend to look to our right (Rabon 1992). Now, this eye movement doesn't mean that everything someone says is a lie—for example, when we ask someone to imagine what would happen with a given circumstance, or whether a given circumstance could be possible, the individual looks to the right in order to construct and examine that event. It is only when someone is trying to remember what actually happened that the right-side eye movement may indicate that they are trying to fill in blank memories. Be careful, as well, to note whether the statement and eye movement patterns truly correspond. A witness may visualize a memory, then go over it in their head first, thus causing a shift in left-right eye movements, before deciding to respond to a question. That does not implicate them as liars. Note also, that these points only refer to visual and auditory memories. Emotional memories have different physical responses. Eye movement for a truly emotional memory may include looking down, looking to the right, and blinking or closing the eyes.

Rabon (1992) listed several physical indicators for deceit (*e.g.*, restlessness, tenseness, flushed appearance, evading questions) but also made an important point about investigators who have an agenda: "The investigator who, inadvertently or deliberately, conveys disbelief to the subject will be likely to observe stress-

related symptoms, but in this context the investigator will be unable to determine whether (a) the physical manifestations of stress are deception-generated internally by the deceptive subject, or (b) the physical manifestations of stress are investigator-generated externally by disbelief in a truthful subject."

Field Hunting

Each cryptid requires different techniques for field hunting, but here are a few general points to consider.

Don't go out alone if overnight camping is a new experience. If you are unprepared, you could run into serious problems. Wild animals, inclement weather, rough terrain, and getting lost are just the start of potentially painful experiences. Be prepared for rough hiking. Many sighting locales have difficult terrain and are inaccessible by vehicle. This means getting in shape before starting out on a ten mile hike. Take caution of sunstroke or heatstroke.

Be knowledgeable about survival techniques and first aid. Accidents happen. Just think about pulling a groin muscle a couple miles from your car. (That's a *minor* injury!) Cryptids, if they exist, are wild animals and potentially dangerous. Don't expect Bigfoot to be the gentle forest guardian portrayed in television and movies. There's little chance of harm if you are careful and keep a distance, but don't expect to shake hands. There are other critters out in the woods. Study their behavior and how to remain safe around them. Be especially cautious in areas with known predators.

Do you have a permit for off-trail hiking? Also, even if your target is a small invertebrate, you may need a collecting permit. Most federal and state lands require collecting permits for removing anything at all. Obey all gun regulations in the area. You do not want to be caught with an illegal firearm. ("Gee, Ranger, I was just looking for Bigfoot.")

Travel light, perhaps storing gear at a base camp. Basic equipment: knife, lighter, compass, canteen, water purification tablets, map, snack, camera, binoculars. Water is more important than food. You do not want to end up with *Giardia* by drinking from

an infested spring. You may want to consider a tape recorder and parabolic microphone for night sound surveying. There are quite a few gadgets that are useful, if you've got the funds: night scopes, motion-sensitive camera systems, etc. A good pair of eyes and a lot of patience go a long way on their own, though.

Be aware of what is going on around you. You may not see the animal itself, but you may see signs of its presence. Read up on similar animals so that you know what signs to look for.

Where should you start looking? Study a map of the region before you go in, looking for those areas which might provide food (berry patches, rhododendron), vegetative cover, or water. Pay special attention to potential sandy or muddy areas, where footprints might show. When you go out you are trying to target areas with greater potential than others. Walking around in the woods is not itself a good tactic for coming across a wary animal. Once you locate a target area, the next step is to determine a way to gather supportive evidence and, much better, good physical evidence.

Supportive evidence is that evidence which indicates that an unknown animal exists—tracks, photographs, video images, etc. It rarely, if ever, has sufficient standing to confirm a new species, but does help determine where confirmative evidence might be obtained. Physical evidence includes hair, feathers, blood, bones, feces, and, of course, a body. Not all physical evidence will distinguish a new species, but all proper descriptions require a physical voucher with objective and verifiable distinguishing characters.

Tracking animals, "the reconstruction of activity from the spoor of animals" (Stander, et al 1997), could be useful in cryptozoological field hunting, but requires a great deal of patience and practice. It involves identifying the species or ethnoknown, gathering information about its activities for interpretation, and speculating about its behavior. I would suggest reading field guides by expert trackers like Tom Brown, Jr., for specific tracking techniques.

Casting Tracks

With field work comes encounters with an intriguing form of evidence—footprints. Making life-like copies of the tracks is not difficult, although it requires time and carrying capacity for the necessary materials.

Plaster of Paris is easy to use and cheaply obtained from home repair stores. You will need plastic containers with tight lids to carry approximately two parts powder for every one part water. After practicing a few times, you should get an idea for how much that will mean for the size of the tracks you are seeking—just remember the possibility of encountering more than one good track at a time. A Bigfoot investigator will require more materials, for example, than someone looking for eastern cougar tracks.

Once you locate a track in sand, dirt, or mud, photograph it first. You want to have a record of what it looked like in situ. Next, carefully remove loose twigs, stones, and other debris from the track. If there is debris that is not loose, do not pull it from the track. That would just damage it. If there is water standing in the track, you can use pieces of paper towels for gentle absorption, but be careful not to press them into the track.

Frame the track by placing a cardboard or plastic strip around the track, and then pressing the edge into the ground. It can be a band of an inch or so in width, paperclipped to hold it together. Plastic works best, as cardboard sticks to hardening plaster. It is also possible to create a wooden frame, but it needs to be large enough, or adjustable, for large tracks. Wood will also stick to plaster, but you can use a bit of motor oil to wipe it down first, creating a non-stick barrier. You can use modeling clay on the inside corners of the wood frame while positioning it in the field so that any holes or seams between wood and ground are filled. If you are casting in mud or sand, you can use the surrounding medium to build a wall around the track rather than using a constructed frame.

After the frame is ready, mix together your plaster and water. Add the water to the mixing bowl first, then slowly sift on the plaster powder. You will have to visually estimate the amount of water needed, about 2/3 of the amount you think would fill the frame. Mix by hand, using a rubber glove. Powders can remove

moisture from your hands, so it is good to get into the habit of using a glove. Other products (gypsum powders and cement) can cause serious burns if you don't use gloves. Slowly sift in the powder, moving your gloved hand back and forth at the bottom of the bowl. Gently break apart clumps under the surface. Don't bring your hand in and out of the water, as that creates air bubbles. Once the powder begins to clump up on the surface, becoming damp but not submerging, you should have a good mix. Continue mixing with your hand for three minutes. The final consistency should be thick and creamy. If it is too thin, the set plaster will be too brittle. If it is too thick, the plaster will end up soft and crumbly. Remove your gloved hand slowly, let the mixture sit for 30 seconds or so, then gently tap around the sides to get air bubbles to surface. Once you do that, it is ready to pour.

Don't pour directly into the track itself. The falling plaster mixture could easily destroy fine details. Pour on the ground next to the track, allowing it to roll downhill into the depression. Pour carefully around the track, making certain that all of it is covered. Thick plaster castings are preferable to thin ones. After you have poured, add reinforcement. Pieces of wire mesh, thin metal rods, or thin strands of rope can be gently pushed into the back of the piece. Make sure it doesn't go down so far that it will destroy the print itself. Once the plaster has been poured, it should set in thirty to forty-five minutes. The exact amount of time will depend upon the temperature and humidity of the environment.

When the track is set (press a stick gently in the back of the plaster to see if it is solid), lift the frame gently from the ground. Do not try to pry it from underneath—that can crack the surface of the track. Don't bother trying to clean the print yet. The track needs another 48 hours to set firmly. After that, you can carefully scrub the dirt off the tracks. I would not, however, recommend scrubbing areas which might have, for example, dermal ridging.

Tracks in snow can be cast in much the same way. Before casting in a dry powdery snow, however, take a misting bottle and spray the footprint with a light mist. Don't use a hard spray directly on the print. Allow the mist a little time to freeze, then go ahead and cast the print. For a wet snow, dust the track first with a light powdering of the Plaster of Paris.

Several other products have been suggested as substitutes for Plaster of Paris. Gypsum cements, like Hydrostone or dental cement, are much sturdier than Plaster of Paris, though not as easy to acquire. Still other suggestions are rooted in the desire for a material that can be used without lugging around containers of powder and water. Clark (2000) used a quick-dry polyurethane spray to first fix tracks and prevent distortion. Then, he covered the tracks with 3M spray adhesive. This resulted in a lighter casting, although it did require at least 4 hours on a hot day before being lifted up. 12 hours were necessary before the spray adhesive had set firmly. I do not know whether this technique will allow for fine details like dermal ridges to be picked up in the cast.

One other material is sometimes used by biologists for casting tracks—a three to one mixture [by weight] of paraffin and rosin (Wilson 1996). The mixture is prepared prior to field work by melting a suitable amount of paraffin in a double boiler and stirring in the rosin powder. The mixture is poured into molds created from heavy-duty aluminum foil, and allowed to harden. Once in the field, a track can be prepared as with a plaster mold, by framing it and carefully removing debris. A candle is then set up in a makeshift candle-holder (cut an X in a plastic coffee-can lid), and a chimney is created from a cardboard milk carton or similar sized can. This allows the paraffin-rosin mold to be set on top while keeping the wind from blowing out the candle. Don't allow the flame too close to the mold, as the paraffin-rosin mixture is flammable. The candle's flame should melt the mixture, which can then be gently poured into the casting frame. Again, don't pour directly on the track, but allow it to gently seep into it from the side. The mixture should harden in about an hour. It will turn opaque and will be much sturdier than the plaster castings. One disadvantage, of course, is that heat could melt the casting again, so it must be kept away from extreme high temperatures. This is probably a better method for smaller tracks [felines, canines, etc.], but practice may allow it to be used effectively for primate tracks.

In all cases, you should practice with your choice of materials before going out into the woods. You might find one form better suited for specific conditions, and may need to switch from one to another depending upon the location and climate.

Hair Traps

After footprints and photographs, hair samples are one of the most widely sought evidences by cryptozoological investigators. For years, this was primarily for structural comparison, as mammalogists attempted to determine the species or species affiliation by examining the structure of the hair itself. Over the last several years, another use has made hair sampling popular in wildlife research—genetic analysis. Hair contains the DNA of the animal it comes from, and researchers can differentiate species with mitochondrial DNA. Is this useful to cryptozoology? It certainly can be used to cull out hair samples from known species (deer, bear, squirrels).

DNA itself can be used as a distinguishing characteristic, but there is little scientific support for using an unrecognized DNA sequence as a type specimen, especially without corroborating evidences. This does not mean that a detailed analysis of the DNA could not provide any information about the animal, but most amateur researchers do not have the luxury of low-cost in-depth genetic testing. Further testing might match genetic markers in the DNA to a specific group of animals, which, if you can show that the animal hair come from an unrecognized species, could spur further research.

Mammalogists collect hair naturally found, for example, on feline-rubbed trees or in primate nests. This is hit or miss, however, and is not viable for every cryptozoological investigator. It is more feasible to set out lures or scent traps along with hair collection devices. Hair can be obtained using several common products—barb wire, coiled wire, Velcro strips, rough carpet patches, hardware cloth, or the metal plates from dog brushes. (For those James Bond types, there is even a “hair dart” which can be shot at an animal to grasp samples.) The tool used should be determined by the species targeted and the surrounding environment. Barb wire works well, but should not, for example, be used in areas with livestock or human foot traffic.

Mammals are lured to these collecting devices by bait or scent. Often, a bait used for one species will be ineffective for another. Or, the bait you use might just bring in all kinds of known species.

Bears are particularly notorious for investigating bait traps. Wildlife biologists use a plastic disk saturated in fatty-acids as a scent trap for generic predator studies, but some species require a more specific lure. Sometimes, a visual lure should be added—felines might be intrigued by a feather or shiny object dangling from a string.

While scent stations are popular in wildlife biology, there are studies suggesting that they are not completely reliable in species abundance surveys. I won't go into details here, but there are indications that some species are sensitive to changes within their territory and will stay clear of scent stations. It may be necessary to bait an area for a period of time without collection devices, before advancing to scent stations. Unfortunately, that can attract species like bears, so use caution. In any case, make certain that your activities would not be considered illegal under your state or province game laws.

How many stations should you set out? If the material is cheap, and you have legal access and all appropriate permissions, plant several stations near game trails, water supplies, food sources, etc. How they are placed will depend on the cryptid. A carpet patch soaked in a catnip-based scent can be attached to a tree a few feet from the ground for feline cryptids. A strand of barb wire could be strung six feet off the ground between a few trees if you are baiting for Bigfoot. Be responsible and remove all stations once you are finished.

When collecting the hairs, use sterile tweezers and clean plastic sealable bags to prevent contamination. Field samples may have contamination from other species, but try to keep your own hair from being mixed with them. Keep the samples dry until they can be sent to a laboratory. Anyone gathering hair samples should have a plan for sample analysis in place before collecting specimens. You should partner with, if not a biologist or anthropologist, someone with technical training in genetics who understands what needs to be done and can oversee the project at a university lab or order the appropriate tests from a professional genetics laboratory. There are laboratories which offer wildlife species identification services to researchers, but there is no point in ordering tests if you do not know how to interpret them. See Appendix 3 for a list of potential genetics laboratories.

Feces can yield mitochondrial and nuclear DNA for species identification and other studies (Surridge 2002), but I do not recommend working with fecal matter unless you are prepared to deal with the potential danger of zoonoses, and can identify common mammalian stool specimens. Working with feces requires rubber gloves and air-tight sealable bags. Do not directly touch or smell feces for safety and contamination reasons. Once you get the fecal matter back to your workshop, dry it out as completely as you can, as moisture contributes to DNA degradation. Ethanol can also be used to keep DNA fresh, but may be difficult to ship due to flammability.

For species other than mammals, there are alternate sources for DNA. A snake's shed skin, a bird's feather, and blood samples can yield DNA.

Body of Evidence

An entire body, alive or dead, would be conclusive physical evidence for most vertebrates, and certainly any distinctive cryptid. (Small invertebrates often require more than one specimen depending upon gender and life-stage morphologies.) At this point, the live capture of most larger and well-known cryptids is at best a pipe dream. This shouldn't keep anyone from trying, but the funding and equipping of such a venture is well beyond most investigators' province.

Live capture of large vertebrates should never been attempted without supervision of experienced wildlife biologists and veterinarians. There are guides available for certain techniques (*e.g.*, darting primates (Sapolsky and Share 1998) and other mammals (Osofsky and Hirsch 2000)), but these should never be tried by inexperienced investigators. There are too many variables involving animal stress and human safety for an untrained amateur. It is not uncommon for animals to die during professional trapping or tranquilizing, and some species, like the recently described saola (Henshaw 1997), are prone to post-capture mortality. The risks are much higher when nonprofessionals enter the field. Live capture is feasible with smaller vertebrates and invertebrates.

Again, check your game laws—trapping for non-game species may require a scientific collecting permit, which necessitates partnering with a recognized scientific authority.

Under no circumstances should an animal be captured, taken from the field, and then released back into the wild. This greatly increases the chance of introducing disease into a wild population. A professional scientific capture-release program may be able to provide sterile conditions and health examinations for captured specimens. I have yet to see a cryptozoological program seriously incorporate this. Direct human contact should be avoided, especially with primates. (Zoonoses travel both directions.) Common human pathogens like measles, influenza, and parainfluenza can kill individuals or abort pregnancies in non-human primates (Jones-Engel, et al 2001). If you are not going to release the animal immediately after collecting basic data upon capture, take responsibility for locating an appropriate museum or zoo for its scientific accession, or don't bother collecting it at all. You do not have the right to endanger a population just to ease your own conscience.

Physical remains can be bones, skulls, skins, or entire bodies. While a few species have been named on the basis of bits and pieces, in most cases those do not allow adequate morphological differentiation. The ethical scientist will pursue better evidence before naming the animal. Bones and skulls will rarely be found lying around in the forest—that's an obvious point we make when asked why someone hasn't tripped over a dead Bigfoot in the woods. There are too many nutrients in bones for them to go to waste. Nature is very efficient. One place where skeletal preservation does occur is in caves. This is off-limits in many areas, however, due to conservation laws protecting caves and cave life.

Incomplete specimens can often be analyzed genetically to determine if they are examples of a known species. Carr, et al, (2002) detailed the analysis of a carcass that washed ashore in Newfoundland. PCR amplification of a mitochondrial DNA sequence allowed the researchers to match it to a species (sperm whale) from the Gen-Bank taxonomic database. The database does not yet have type sequences from all known species, but it helps to winnow out morphologically unidentifiable specimens of many known species.

The legality of killing an unrecognized species is, in most cases, undetermined. While it seems that a species not currently recognized to exist should not be considered an object of native species regulations, I don't trust governmental wildlife agencies in some regions not to press the point just to acquire the specimen in question. I have seen at least one state fight to take a specimen of a threatened native species which they acknowledged as being taken legally from another state where the species is abundant. Would a state fight to take a Bigfoot specimen if they thought it was going to be accessioned into a museum in another state? I wouldn't bet against it.

Personally, I would not advertise acquiring a specimen until it was accessioned into the museum of my choice. I should make clear that the description of a new species requires verifiable evidence in the form of a voucher type specimen. This means that an investigator must provide the specimen to an appropriate voucher collection so that it remains a perpetual confirmation of that species. You can't keep Nessie in your freezer. Now, if you make an arrangement with a museum, economic or otherwise, that's between you and them, and possibly your lawyer, but it is completely unethical to keep a specimen away from scientific review.

The determination of which museum receives the specimen should consider the extent of regional material in their collection, their ability to maintain the specimen (some museums don't have the proper equipment), or their emphasis on certain animal groups. Do your research before you hunt. Once you obtain a specimen, it should reach a professional for proper preparation as soon as possible.

How exactly would one go about obtaining a body? I am well aware of the debate over hunting Bigfoot and other cryptids. The argument usually goes "it must be very rare, so killing one could destroy the population." I'll summarize my opinion—for a species to exist in North America, and continue to survive, we need to know that it is there. There are too many potential dangers, including habitat destruction, genetic isolation, competition with introduced species, and novel diseases like West Nile, for us to pretend that a species will survive successfully in our ignorance. Populations can collapse significantly with the right triggers—triggers which

might have been prevented if we were aware of them. Baseline biological studies can't be made until a species is acknowledged to exist.

A second argument involves the morality of killing an animal, in and of itself. That is, and should remain, a personal decision. Heuvelmans argued against collecting live or dead specimens. Unfortunately, however, he moved this argument to another arena by claiming, "The greatest naiveté of beginners in cryptozoology is to imagine that they will definitely solve a case by producing a solid piece of evidence: a very distinct movie, perfect tracks, or, preferably, an acquired specimen" (Heuvelmans 1988). He continued by stating that such *autoptical* evidence must be accompanied by testimonial or circumstantial evidence to be persuasive. That claim is clearly incorrect. I agree that photographs, videos, tracks, and some biological evidences are not sufficient to confirm whether or not a species is distinct, but to claim that no biological evidence can do so is unwarranted. The examples to which Heuvelmans pointed do not justify that conclusion. Several of the examples are from paleontology, where fossil reconstruction may have been faulty at first discovery—a poor analogy to modern organismal biology. The whole specimens he does reference include ones which were later clearly identified [an Onza specimen as an aberrant cougar] or which are not actually available for study [*"Homo pongoides"*]. Incomplete specimens may be insufficient for confirmation, but I suggest that as technology advances, even those might prove clarifying in the future—assuming investigators remember to revisit them. I have no doubt that with most cryptids, should a whole body become available, that is all that will be required to confirm whether or not it is a new species. Folklore is our guide to these species, but it is not a pillar upon which confirmation rests.

Hunting a cryptid is not for everyone. I don't expect all investigators to take it up, and there are certainly other ways people can contribute to cryptozoology. It is a shame, though, to see some investigators manipulate others into non-productive activities just because hunting offends their sensibilities. Technology is not the magic pill for cryptozoology—we cannot substitute subjective technology-based evidences for objective physical evidence. Cer-

tainly, no organization which claims to be science-based should disparage those who choose to hunt, especially when they offer no viable methodological substitute. You can purchase all the expensive optical equipment you like, and still end up with evidence which only ignites controversies rather than confirms the existence of a new species.

Again, how exactly would one go about obtaining a body? For a discussion on mystery primates, see Appendix I, where Ivan T. Sanderson's commentary on ABSM hunting is reprinted. While somewhat dated, Sanderson's experience as an animal collector provides valuable insight into a serious subject. My interests are mostly in smaller cryptids, especially reptiles, which do not require elaborate expeditions. Tracking and capturing techniques for small cryptids must be creatively adapted from those for known species, incorporating details gleaned from collected sighting reports.

A Game Plan

Let's pull all of this together. How do we investigate a mystery animal?

1) Determine the cryptid to be investigated. This can be a well-known mystery animal, one that has been reported only a few times, or one which you discover on your own. Try to narrow your focus to a specific region, especially one which you can visit regularly.

2) Collect sighting reports through literature searches, historical research, and witness interviews, making certain that you get as many details as possible.

3) Examine the areas where sightings have been reported, using maps and personal visits. Look for patterns in topology and habitat which may indicate specific locations for evidence searches.

4) Determine the most likely animal grouping [as broad as bird, fish, or reptile, or as specific as primate, snake, or feline] your cryptid may fit, and collect appropriate phenological and ecological data on the group.

5) Use the data you have collected in points 2, 3 and 4 to target those areas most likely to provide supportive evidence (photos, DNA) or confirmative evidence (live capture or body). Supportive evidence should be used to obtain confirmative evidence, or published so that others can use it.

6) Once confirmative evidence is obtained, and does not immediately prove to be a known species, it should be provided, through pre-arrangement, to a professional who can analyze it further, accession it into a reputable museum collection, and, if the species proves new, author a species description for formal publication.

Biological Modeling

One essential point in cryptozoology is that we should never assume that a cryptid must be a specific animal. Too often, investigators decide that a cryptid must be a particular fossil species. It is as likely, if not more so, that a new species is only loosely related to known fossils or just shares a few morphological similarities. Focusing on specific fossil species especially leads to problems because paleontological considerations are rarely in stasis. Naish (2003) noted that the modern view of plesiosaur morphology is a far cry from that of the late nineteenth century or early twentieth century, yet some lake monster investigators continue to rely on inaccurate data to support their claims.

Another example involves *Panthera atrox*, a large North American feline that has been occasionally claimed as the culprit in reports of maned mystery cats in this continent. Studies have shown that this feline was huge (Anyonge (1993) observed, "estimated to have weighed 344-523 kg . . . , a range in body size comparable to that of the large living ursids"), and probably didn't hunt in African

lion-like prides (Jefferson 1992). If not conspecific with the European cave lion, *Panthera leo spelaea*, it was certainly very closely related (Harington 1969). Past reconstructions of this feline have usually been lion-like, but recent cranial studies (J. Th. Groiss 1996) took the stance that both the European species and *Panthera atrox* were most similar to tigers rather than lions. If there are, in fact, legitimate maned mystery feline sightings in North America (for which I have seen little evidence and quite a bit of illogical rambling about how the exotics trade couldn't be responsible), they should not be affixed so tightly to any specific fossil cat. Theories should never supplant real evidence.

Rather than predetermining what a cryptid is, we should use ecomorphological models. Let's say that you want to investigate reports of Chessie, and have collected numerous sightings of a large serpentine aquatic creature in the Chesapeake Bay. There are several different animal morphologies which create the look of a serpentine form—snakes, eels, certain invertebrates. We can also look at the ecology of the suspect habitat. How might form and habitat work together here? What have you learned about similar species, or other species inhabiting the same habitat, which suggest a technique to collect evidence which can be used to confirm or refute the possibility of a new species?

Publishing Data

As you become more involved in cryptozoology, you will want to consider publication a critical component of your research. There are a few levels of publication, each with its own purpose and emphasis on details. I am not advocating the idea that ongoing research must be an open book—there are legitimate cases where confidentiality is necessary and appropriate. Personally, I do not provide witness contact information without permission, and even then only to individuals I trust to maintain a professional investigation. Traditional scientific research certainly advocates confidentiality when warranted by proprietary data, corporate sponsorship, etc., so there is no scientific obligation for cryptozoology to act differently. The hijacking of the Indonesian

coelacanth description certainly serves as a warning with cryptozoological discoveries.

A reviewer once disagreed with my opinion on this subject, by pointing out that confidentiality makes it difficult for anyone to re-interview and confirm or reject the story on their own. I do recognize this problem, but I will point out that confidentiality is standard practice in at least one major scientific field—medical science. Go through any medical journal and you will see that case studies of medical conditions do not provide the patients' names and addresses. Yet, these journals provide enough information about the patients and the pertinent characteristics in question, that that information really isn't necessary. I believe that if the investigator does the job properly, keeping accurate and detailed notes, this becomes less of a problem. Again, I will share contact information with permission and to reliable investigators, but there really is no scientific compunction to recklessly leave a witness open to ridicule and embarrassment.

When in the initial sighting-collection phase of an investigation, it can help to summarize your interest and present it for suggestions and input from experienced investigators. There are a few larger email discussion lists, public and private, which can be useful in jump-starting discussion and debate. Just be careful, as many of the public lists attract inexperienced enthusiasts who may be more distraction than help. I actually suggest working with a small group of like-minded investigators who have experience in your field of interest. I personally make use of both a larger group made up of investigators, biologists, and enthusiasts, and a very small group of experienced researchers. The former group is helpful for discussions on a wide range of cryptozoological subjects, and the latter group focuses on actively investigating a few interesting cases of common interest.

We seem to be at a low point as far as cryptozoological newsletters and journals are concerned. There are a few still in print, but several of the more interesting ones ceased publication in the last few years. Personally, I edit an online newsletter, the *North American BioFortean Review*, and recommend PDF publishing as an avenue for future newsletters. The publication costs are much lower than for print publications, and the audience is far wider. If

you have a summary of your research, and don't think you are able to come to a satisfactory conclusion in the near future, I recommend making it available in one of the cryptozoological newsletters. One problem in the history of cryptozoology is that reports and investigations never get published, and the researchers drop out of sight. That information becomes lost to anyone else willing and able to pursue it.

At this point, there is no peer-reviewed journal for cryptozoology. The quality of articles in the dozen or so issues of the ISC journal verifies that such a resource is viable if set up properly, but it would be a large task indeed. Perhaps with the advent and growth of web-based science journals, that might be a possible arena in the future.

In the meantime, there are other avenues for peer-reviewed publication, though this may require some effort in searching. While it is unlikely that upper-level journals like *Journal of Zoology*, *Science*, *Nature*, or *American Naturalist* would accept a cryptozoology article (it has been done, but rarely), there are smaller journals which might be open to a well-written article that sticks to the facts and doesn't run into rampant speculation. Many of these are regional journals, or belong to small specialized societies. You might consider publishing in a folklore or anthropological journal, as cryptids are as much about ethnozoology as they are biology.

Of course, should you be able to prove Bigfoot's existence, the formal description should be published in as wide-spread a professional science journal as you can find. There will be plenty of investigators wanting a copy for framing.

Describing a New Species

The purpose of naming a species is to create a specific unequivocal label which will be understood by anyone in the world to refer to, and only to, that species. This label has two parts: genus and species. Thus, within the genus *Crotalus*, the name *Crotalus horridus* refers to a single species of rattlesnake, commonly known as the timber rattlesnake. A genus sometimes includes

other species—e.g., *Crotalus adamanteus*, or eastern diamondback rattlesnake. A farmer in Pennsylvania may comment that he saw a diamondback rattlesnake in his field, but he would not be able to say (assuming no herpetofaunal introductions) that he saw *Crotalus adamanteus*. Common names are often confused or interchanged, but a species name is fixed. This taxonomic arrangement of genus and species comprises binomial nomenclature.

The process of species description starts with the observation and recognition of differences between a new animal and known animals. Sometimes, visual characters are obvious, while at other times differentiation requires genetic analysis. Caution must be used to ensure that the differences are truly of a species level. It was a common mistake in early reptile descriptions to describe a juvenile and adult as separate species, when the describer was fooled by ontogenetic changes. Environmental factors, mutations, and hybridization also create confusion.

While I would not recommend that a single investigator describe a new species without the assistance of professional biologists, there is no rule against laypersons pursuing this activity. A detailed introduction can be found in Judith Winston's (1999) *Describing Species*. The specific guidelines for zoological descriptions are spelled out in the current edition of the *International Code of Zoological Nomenclature*.

CHAPTER SEVEN

The Feasibility of Cryptozoology

"You have to combine a questioning of everything with a will to achieve something."

— Richard Ernst

No zoologist debates that there are undiscovered and unnamed animals. There are millions of species still untouched by science. The vast majority are invertebrates or small vertebrates which rarely if ever come into direct contact with humans. Biologists have tried to estimate the total number of species inhabiting the earth, but published studies end up with more questions than answers. Estimates of arthropods alone range from 3 million to 80 million species, depending upon the assumptions and formulas used (May 1986; Thomas 1990; Stork and Gaston 1990). May (1988) noted that the commonly published estimate of 30 million arthropod species is extrapolated from a single group, the beetles. He pointed out that the underlying arguments for such an estimate require a great deal more study, with firmer data, before we can rely on any global species estimates. Patterson (1994) was more succinct: "Biologists do not know, and cannot estimate to the nearest order of magnitude, the number of species on Earth."

Cryptozoology is concerned with a very small proportion of these unrecognized species—those which have enough salience to be noticed, distinguished, and described by humans prior to scientific discovery. While some of these will be notable invertebrates and small vertebrates, most will be larger mammals, birds, fish or reptiles. There have been a few published estimates for

these larger species. Paxton (1998) formulated a species description curve of large open water marine animals discovered since 1830, suggesting that perhaps 47 such species may yet be described. Paxton's study indicates that likely marine groups with larger unknown species include cetaceans, bony fishes, and sharks. Pine (1994) noted that new mammal discoveries are not uncommon, and that while smaller species prevail, larger species are represented by about three new discoveries per decade. Gaston and Blackburn (1994) noted that there are about three new bird species described every year.

What Factors Keep Unknown Species Hidden?

Where and how may salient species remain undiscovered? The pertinent factors are both environmental and biological: proximity to humans, accessible geography and habitat, phenology, behavior, size, and visual conspicuousness. A tiny, nocturnal, burrowing rodent endemic to a remote South American plateau is less likely to be discovered than a large, aggressive, diurnal ungulate found across an entire continent. Between the two extremes are opportunities for discovery, as we learn to compensate for barriers by examining clues, surmising from the evidence, and then acting on speculation.

We can reasonably speculate that the smaller the local human population, the higher the chance for larger species to remain undescribed. To test this, I would suggest an examination of the human population numbers for the regions where notable species have been discovered, at the time of discovery. There certainly have been some interesting discoveries near highly populated areas (*e.g.*, the discovery of a new primate, *Callithrix humilis*, within an hour's flight from Manaus, Brazil (Environmental News 1998)), but in general, new discoveries should be less likely to occur within highly inhabited regions. Fragmented population areas, certainly, may offer more unknowns than homogeneously populated areas.

Accessibility factors into any discovery prediction. A visually conspicuous species may be completely unknown if it exists beyond

human reach. Patterson (1994) found that early type localities for South American mammals "are mainly clustered along coastlines or navigable waterways, whereas South America's interior basins and the Andean cordillera are much better represented in later records." He pointed out that locally endemic species may be consistently overlooked because of difficulties in traveling to remote areas. Regional zoological surveys may eventually find them, but this is hit or miss without extensive funding and effort.

Patterson (1994) noted that larger Neotropical rodents were described before the smaller ones. Blackburn and Gaston (1995) found that with South American passerine birds, however, the size of the bird was not a good predictor of early description. Rather, size of its geographic range was a very strong contributor to early description. Altitudinal range and abundance may have some small significance, but overall range size was most important. The authors suggest that visual conspicuousness may be a strong factor in discovery, but they could not effectively analyze that characteristic. In a broader study, (Gaston and Blackburn 1994), the authors found that recent discoveries [1966-1990] of birds worldwide proved to be primarily smaller species. They believed, however, that it was the combination of various size-related factors [e.g., smaller birds have smaller geographic ranges] rather than small size itself, which directly related to a late description date. Similarly, a study of both North American and Australian herpetofauna (Reed and Boback 2002) could not correlate body size and description date. The authors suggested that other elements (e.g., cryptic behavior, geographic range size) are confounding factors.

The more a human group moves into a species' geographic range, or vice versa, the greater the opportunity for encountering the species. Gaston (1991) pointed out that there are two distinct ways to characterize geographic ranges. The *extent of occurrence* is a broad representation of the latitudes and longitudes which encompass locality records, sometimes represented by full counties, states, provinces, or countries. The *area of occupancy* narrows down the representation by excluding localities where no records have been made. In any case, Gaston noted that geographic ranges do not have true edges, as wandering individuals within a species alter previous range distributions through time. Range size is

influenced by animal size [smaller animals tend to have smaller range sizes] and by geography. Rapoport's rule (Kauffman 1995) notes that the average size of geographic ranges decrease from the poles toward the equator. Specific habitat or climatic preferences can also constrain a species' area of occupancy.

Sometimes overlooked in published discussions, the investigator's competence and abilities also contribute to a species' discovery (or lack of discovery). Lazell (1986) noted that he located a Florida rodent (*Oryzomys* sp.) after previous field work by other researchers resulted in their declaration that the animal was extinct. After the original researchers republished their findings, again declaring the species extinct, an additional researcher located the species on eight further islands in the Florida Keys.

Where Do We Look?

Species diversity is generally higher within lower latitudes [*i.e.*, near the tropics] (Kauffman 1995). Even bauplan diversity [generalized morphological character sets, sometimes illustrated by systematic orders] is lower at polar latitudes. Discoveries at high latitudes will usually be within recognized bauplans from those latitudes. Bauplan diversity is primarily constrained by abiotic (environmental) factors, while species diversity is often regulated by the presence or absence of other species. These biogeographical regularities are not dependent upon in-situ radiation—invading bauplans from other continents follow the same patterns. [Whether northern and southern temperate areas are symmetrical in species richness is another question (Blackburn and Gaston 1996).]

Do lost worlds exist? Could formerly wide-ranging species which have been exterminated throughout much of their range still hang on in isolated colonies? The discoveries of the saola, *Pseudoryx nghetinhensis*, (Van Dung 1994), and a giant muntjac, *Megamuntiacus vuquangensis*, (Schaller and Vrba 1996), along with a rediscovered wild pig, *Sus bucculentus*, (Groves *et al* 1997), have earmarked the Annamite Mountains of Laos and Vietnam as one such lost world where "primitive" species exist long after other populations became extinct.

Lomolino and Channell (1995) examined the range collapse of numerous endangered species, and found cases contradicting traditional biogeographical theory. Standard theory opined that any persistent colonies would be found central in the original range, where the original population would have been more abundant and more stable. The peripheral population, being less abundant and less stable, would have collapsed first and become extinct. In many cases, however, such as with the giant panda and red wolf, the authors found that collapse occurred centrally, spreading out towards the peripheral populations. The authors suggested that searches for endangered species should specifically include the peripheral edges of the former range. They noted that peripheral populations, being less stable and more variable, might be better able to survive catastrophic influences which decimate the rest of the population. This tenet, I suspect, can be applied to several areas in cryptozoological exploration.

Technology is rapidly reaching the point where cryptozoologists may be able to predict geographic ranges of some cryptids. Peterson (2001) illustrated the accuracy of the Genetic Algorithm for Rule-set Prediction (GARP) with known bird species. This particular area of research requires knowledge of and ability to use statistical models, but I strongly suspect that interesting results will come from those who pursue this line of study.

Possible, Probable, Plausible

These three terms (and their opposites) are bandied about by both cryptozoological proponents and antagonists, often based upon preconceptions and assumptions which are not scientifically based, even if couched in scientific terminology. While we try to be objective about each cryptid, some are going to be more likely to exist than others. That is clearly a warranted assumption. What kinds of species are most likely to be discovered? We can speculate that new species will more likely come from known extant genera, rather than from completely new genera or from genera known only from fossils. Recent discoveries appear to bear this out overall, but there are exceptions and it should not be

considered a hard and fast rule. At this time, I have not seen a good study of rediscovered species to determine whether rediscoveries are more likely to occur with species that supposedly became extinct within the last few thousand years, or with those known only from fossils. While it may seem more plausible for recently extinct species to be rediscovered, there may be environmental considerations (especially with human interference) which preclude their survival. Our knowledge of fossil organisms is limited to the fossil record, and may not be a good gauge for later survival skills.

Some cryptids are based on little more than quickly-observed sightings or controversial primitive art. Others have better evidence for existence. But some cryptids just don't make it easy for us to categorize as plausible or not. It's the far side of the spectrum which create the most controversies. These *improbables* can be categorized as follows:

Disjunct chronology:

These are the so-called "living fossils," or cryptids which most resemble organisms known only in the fossil record. Dinosaurs and other fossil reptiles are of great interest, although others include moas, mammoths, and bipedal primates that resemble fossil apes. Caution is necessary in evaluating proposed links to extinct species. As Naish (2003) pointed out in regards to "living plesiosaurs," many of the supposed resemblances do not truly match modern paleontological representations of fossil organisms, but rather 19th or early 20th century representations. Cachel (1985) remarked similarly in a review of Myra Shackley's *Wildmen: Yeti, Sasquatch and the Neanderthal Enigma* [1983], "It is rather ironical that the major thrust of the book—that Neanderthals are Almas and are still surviving—is based on a mythological Neanderthal reconstruction. The myth is that Neanderthals were shambling, stupid, speechless, bestial, and doomed in the competition with anatomically modern humans. This myth is not recognized by modern paleoanthropologists, although it flourishes in modern folklore."

Disjunct geography:

These are cryptids which resemble animals known only from other parts of the world. Cougar-like animals in Australia, for example, have been postulated to be the progeny of released mountain lion mascots after WWII, or even pets owned by 1800's American miners, as no such placental mammal is known from that continent.

Disjunct phenotypes:

These are those cryptids which do not appear to have any close resemblance to known extant or fossil fauna. Shuker (1997) pointed to such oddities as Central Africa's giant slug-like *mulilo* and the trunked marine animal killed by whales off the coast of South Africa as examples of "'ultra-mystery' beasts," which "seem to be creatures beyond cryptozoology, too peculiar and too perplexing for even the science of hidden life to feel comfortable with."

Disadvantageous phenotypes:

In a few cases, anatomical characteristics of a purported cryptid may appear to be biologically insufficient to sustain a particular behavior or even life itself. For example, supposed sightings of giant terrestrial invertebrates are examined in light of biological data which point to constraints on modern insect sizes due to oxygenation difficulties. To be frank, such constraints can only be extrapolated from known biological mechanisms, and are subject to constant revision as our knowledge of biology and other sciences grows. Our current knowledge of insect aerodynamics, for example, has long moved past the now-answered question of "how can bumblebees fly?"

Mosaic phenotypes:

These are the cryptids which appear to have distinct morphological characteristics similar to more than one unrelated organism. Investigators must be aware that some characters are not limited to a single group, but can be found scattered through a number of unrelated species. Bioluminescence, for example, is common among marine fishes and marine invertebrates, but is also found almost randomly, and certainly abruptly, in a few species of millipedes, earthworms, and at least one cockroach (Zompro and Frizsche 1999). Why, is not an issue for cryptozoology except to those who are just looking for excuses to discard certain reports.

One-shot cryptids:

These are the cryptids which are conspicuous enough to be reported once, but are never seen again. Some can be traced to misidentifications of known animals, while others are not so easily dismissed. The possibility of an intentional outright hoax must always be considered with these.

Impossible vs. Improbable

We need to understand the difference between impossible and improbable. The immediate acceptance of impossibility is a characteristic not uncommon in academic circles. Greenwell (1992) recalled a physical anthropologist amused by castings of suspected Bigfoot tracks, claiming such a primate was impossible. Greenwell astutely pointed out that under such a philosophy, any and all evidence would be dismissed prior to examination. Rather, he noted, "we are supposed to deal with probabilities, not beliefs," and that while one may certainly assign a low probability to a cryptid, "it should never be absolute zero. In philosophical and statistical terms, one can increase a very low probability should new information from the environment necessitate this; one cannot, however, increase absolute zero at all, at least not without cheating."

Every investigator will, and does, differ in opinion on the probability of different cryptids. So long as we understand that our methodology itself must be based on facts, and that the role of speculation is to create opportunities for fact-based investigations, such differences in opinion are welcome. They may illuminate alternative explanations or point to overlooked mistakes. In any case, feed your opinions with factual information. Read those books and science articles which will expand your knowledge of the natural world and organisms which may be relevant to cryptozoology.

Discovery Science

Strictly speaking, cryptozoology is just one of several paths toward zoological discovery. The bulk of zoological discovery today is through random accidental collecting or organized surveys where the research does not specifically target a potential unknown species. Survey methods may target specific life forms [rodents and other small mammals, birds and bats, etc.] within a given habitat, but the scientists have no prior knowledge of a particular unrecognized species. Such surveying is inherently biased by the methodology used, as each technique or trap has limitations—*e.g.*, pit-fall traps which capture rodents will not capture a large ape. Scientists must use their limited resources in a manner which effectively surveys the most likely groups of organisms based on diversity studies and habitat preferences. Such bias, pragmatic as it is, must be considered a very big hole through which cryptic species can pass unseen.

Cryptozoology is discovery science, not research science. This seems to confuse both enthusiasts and critics alike. From a cryptozoological standpoint, I do not investigate whether Bigfoot is omnivorous or vegetarian, whether Ogopogo mates in the spring or fall, or whether black panthers are territorial or not. I investigate whether Bigfoot, Ogopogo, or black panthers truly exist as distinct unrecognized biological species. Certainly, speculation about diet, reproduction cycles, and territories may suggest a methodology to try in my quest for confirmative evidence, but

that information is not, in and of itself, the goal of a cryptozoological investigation.

Are there scientific analogues to cryptozoology? One comes to mind—epidemiology. While not completely analogous, there are similarities worth exploring. When a village in India or Cameroon is suddenly hit with a wave of deaths by an unknown disease, an epidemiologist collects data on a number of variables (including onset and duration of disease, places which may be involved, personal characteristics of both the stricken and those who weren't) in order to determine why and how the disease broke out, along with a determination of the disease itself (Morton, et al, 1996). Probability studies play a major role in epidemiology. I suspect that biostatistics could be of great use in cryptozoology, as well—there are a few such studies, but not enough.

We too often accept the fallacious argument that discoveries emerge either through chance alone or as a result of long tedious labor with traditional techniques. To understand discovery science, we must recognize the interplay between individual researchers and the organizational framework of their investigations. Hurley (1997) noted several characteristics found in discovery-scientists: clarity of vision, dedication to the subject, persistence in pursuit of goals, knowledge of the subject's literature, organizational skills, leadership skills, enthusiasm, and a willingness to work hard. Creativity's role is often stressed, but "*a well-preparedness or readiness to adopt methods that are more efficient than those at hand or 'to invent a new procedure' when there are no methods available, should be rooted in the rationality of inquiry*" (Jung 1996).

The organized framework for research is just as important as the individual investigator—the "lone genius" is a myth. Hurley (1997) pointed to four characteristics which create an open environment for discovery in research: the ability to use differing methodologies, the freedom to be creative, chance, and sufficient organizational resources (*e.g.*, colleagues, training, supervision). Creativity, as noted, should be tempered with knowledge and critical analysis. Chance does not create discovery—the researcher must be able to recognize and act on the opportunities which arise from chance. Resources and preparedness influence the range of potential inquiries and the ability to act upon them.

There are several perspectives on discovery methodology. The traditional methodology is the use of *logic*, in "a calm, logical, rational process, in which highly intelligent and very focused individuals reach important insights in an entirely planned way" (Hurley 1997). While this sounds scientific, it does not prove a viable mechanism for developing new ideas. With the *problem-solving* approach, the ability to formulate a question correctly is as important as answering the question itself. Hurley (1997) delineates one problem-solving strategy (*smart foraging*) as:

- 1) Search begins with a subject familiar to the researcher, seeking clues from every source
- 2) Search is modified to focus on areas most relevant to the question
- 3) Researcher encounters a probable clue, assuming that an answer exists
- 4) Clue is recognized as useful by the prepared researcher
- 5) Researcher distinguishes valuable clues from diversions
- 6) Following good clues leads researcher to discovery

Another perspective on discovery suggests that there is a natural selection of theories and insights (*insight survival*) emerging from chance or anomalies. New ideas are subjected to pressures (personal or community) which weed out the least fit. Those which survive scrutiny are given more attention. A final perspective is that discovery is *analogy-based*, in that ideas don't come out of thin air. Scientists may recognize similarities from other fields and test models based on such resemblances.

Can discovery be planned? Hurley (1997) argued that it can, but that it requires more than the application of logic. The discovery-scientist must be able to make necessary speculative leaps, build upon the work of others, recognize opportunities as they arise, be well prepared and knowledgeable about his subject, and be committed to the pursuit of an answer.

CHAPTER EIGHT

The Credibility of Cryptozoology

“Those who live in lonely places, surrounded by the wilderness and by aboriginal peoples with mythological and personal accounts of hairy giants are more apt to believe in and fear unknown oversized creatures than a psychiatrist with an urban middle-class background could possibly imagine.”

—Louise M. Jilek-Aall, M.D. (1972)

Before approaching criticisms of cryptozoology, let me provide groundwork for the credibility of cryptozoology as a methodology.

Is cryptozoology self-correcting?

One of the most important characteristics of a scientific field of study is that it is self-correcting. Mistakes and errors must be sought out and discarded. In a field where misidentification and hoaxes are expected, it is impossible to maintain credibility if they are ignored or continue to be promoted. Cryptozoological investigators do identify sources of error and inaccuracy. A few cases to note:

- Williams' (1985) field investigation identified a Papua New Guinea marine cryptid, the Ri, as a dugong.
- Baird (1985) illustrated how Sasquatch-like footprints with dermal ridges could be fabricated.

- Chorvinsky and Opsasnick (1989) located and interviewed the man responsible for a series of bipedal “swamp creature” sightings near Selbyville, Delaware.
- Winn (1991) reported that analysis of purported Bigfoot hairs showed them to be deliberate hoaxes—synthetic fibers.
- Bauer and Russell (1993-6) noted difficulties with the description of *Cadborosaurus willsi*.
- Dr. Rafael Palmeros (1994) concluded that the photographed “sea monster” carcass found on the shore of Palmar de Susana, Mexico, was cetacean.
- Loren Coleman (1995) pointed to inconsistencies in the 1958 “Jerry Crew incident” of Bluff Creek, California, and specifically identified Ray Wallace as a known hoaxter.
- Loren Coleman and Michel Raynal (1996) provided evidence identifying the De Loys photograph of a supposed South American bipedal primate as a known spider monkey and brought to light the racist background behind its promotion.
- M. K. Davis and Jay Michael located a foot device used to create Honey Island “swamp monster” tracks. Test results were reported at the 3rd Texas Bigfoot Conference, Jefferson, TX, in October 2003.

Of course, the discerning investigator will recognize that pointing out problems is itself subject to deliberate or unintentional error. The gullibility of the news media and skeptics surrounding the extent of the Wallace hoaxes is a case in point—as was the gullible response to an earlier *exposé* on a purported zipper in the Patterson-Gimlin film.

Are there professional scientists within the field of cryptozoology?

There are a number of degreed professional scientists who consider cryptozoology a viable methodology—evidenced by their willingness to publish in the field. This is readily apparent by looking at any of the back issues of the ISC journal *Cryptozoology*. The International Society of Cryptozoology has, unfortunately, ceased to exist due to financial difficulties, but while active it included board members from top universities and museums around the world—e.g., the Smithsonian, American Museum of Natural History, Beijing Natural History Museum, Royal Museum of Scotland, Transvaal Museum, University of Paris, Australian National University, Brown University, University of Calgary, Villanova University, Illinois State University, University of Chicago, and Ohio State University.

In an anonymous survey of professional biologists, King and Greenwell (1983) noted that more than half of all respondents agreed that scientists *certainly* or *probably* should undertake research of Nessie or Bigfoot. Fewer believed that the government itself should fund such projects.

Today, the academic landscape is quieter, but several of the larger private email discussion lists include members with master's and doctoral degrees in biology and other sciences. I suspect that there would be interest in creating at least a web-based peer-reviewed journal on cryptozoology, if the appropriate academic leadership could be found. Without a central organizing body, future academic interest will be stifled until such time as a significant specimen is finally obtained.

Are there scientists who use the methodology of cryptozoology within traditional zoology?

It should not surprise anyone that the methodology of cryptozoology is used by traditional zoologists, even if they do not recognize it as such. These discoveries can be identified as cryptozoological by simply determining whether the new species was targeted for investigation prior to discovery (through photo-

graphic evidence, sightings of unrecognized animals, cultural folkbiology, etc.), and whether the resulting investigation was responsible for the species' discovery. Historically, this methodology was responsible for such well-known discoveries as the Komodo dragon and the okapi. Recent discoveries may not be as exciting, but they convey the validity of targeted-search methodologies:

- Intrigued by an unusual jawbone, a piece of fur, and a photograph, Flannery (1998) tracked down a distinctive new tree-wallaby, known to the Irian Jayan Moni as the Dingiso. He described it in 1995 as *Dendrolagus mbaiso*.
- Whitney and Alvarez Alonso (1998) recorded bird vocalizations in northwestern Loreto, Peru, later realizing that one song was an unrecognized species of antwren. A search was mounted for the bird in early 1995, successfully collecting confirmatory vocalizations and specimens. It was named *Herpsilochmus gentryi*.
- Whitney and Alvarez Alonso (2001) published the description of a tyrannulet first recognized by its distinctive vocalization. A specimen was collected in early 1997 and named *Zimmerius villarejoi*.
- For almost two decades, ornithologists heard reports of an unidentified owl on the island of Sumba, Indonesia. Two expeditions were necessary before Australian ornithologists gathered the necessary evidence to prove the existence of *Ninox sumbaensis* (Olsen et al 2002; Kingsley 2002).
- The pygmy seahorse, *Hippocampus denise* (Lourie and Randall 2003), was first recognized as unknown from photographs. A search for the tiny species eventually succeeded in collecting specimens.

- After being asked to identify a large red medusa videotaped during a 1998 undersea geology expedition, marine biologist George Matsumoto suspected it was a new species. Examination of submersible videotapes showed that the jelly had been observed since 1993 off California, Hawaii, and Japan. A new subfamily was created for this species, due to its distinctive morphology—rather than tentacles, the jelly has thick oral arms. It was named *Tiburonia granrojo*, and nicknamed “Big Red” (Matsumoto et al 2003).

The potential for targeted-search methodologies can be found in other papers. Bauer and Pauwels (2002) described a new species of *Hemidactylus*, from Mt. Iboundji, Gabon, captured during a routine herpetofaunal survey. The gecko was already known to the local Massango tribe as the *ngouta dibongui* (forest gecko). I suspect that similar cases with prior knowledge are never recognized as such, as that information may not be considered important enough for authors to include in formal species descriptions.

Another case involves the shoal bass, a large North American gamefish that was described only a few years ago (Williams and Burgess 1999). This species had been recognized as distinctive by fishermen for decades, and some minor professional interest had been sparked years earlier, but it still took a long time for the fish to find its way to a proper description. In a University of Florida press release, one of the co-authors for *Micropterus cataractae* stated, “It’s the end of an era in the sense that all the other bass and trout were discovered long ago, mostly in the 1700s and 1800s. . . From now on, scientists likely will describe only the smaller, cryptic species that have avoided detection despite our best efforts.” Maybe. I have seen hints from an ichthyologist suggesting that there is potential for more cryptic North American gamefishes.

Scientists occasionally publish observations of species which have not yet been identified due to lack of physical evidence. Vecchione, *et al* (2001) noted photographic evidence for a very strange squid from ocean basins worldwide, and observed, “That such a substantial animal is common in the world’s largest eco-

system, yet has not been previously captured or observed, is an indication of how little is known about life in the deep ocean."

Tyler (1962) reported an ethnoknown 12-inch-long frog from the Central Highlands of New Guinea, called the *Carn-pnay*. Tyler investigated the reports, but upon arriving to the locale, was told by the local chief "that the frog was very rare, and usually only seen when it visited the rivers to spawn. Spawning was said to coincide with the ripening of a fruit called 'Marita' which was estimated by the interpreters to be probably during December." Tyler's questioning of the locals showed that they were knowledgeable about frogs, suggesting that further searching might uncover a new species. Today, this frog remains a mystery. Tyler (pers. comm.) noted, "I never had the opportunity to return to the same area and no one else has done so. Nevertheless, every collector brings new species back from New Guinea and I still keep my fingers crossed!"

Vietnamese biologists (Schulz 1995) reported that an apparently unknown species of bovid, called a *Tuoa* by villagers of A Luoi, had been captured but died shortly after (and was then consumed by the villagers). The description of the species suggests that it was distinctive, but science will have to wait for the next specimen before it can be confirmed.

Professional biologists have even reported finding unknown primate tracks. Vietnamese ornithologist Vo Quy photographed and cast fifteen-inch-long human-like prints in North Vietnamese jungles. John MacKinnon, instrumental in the discovery of several large mammals, described finding several strange ape-like prints while studying orangutans in Sabah (McNeely and Wachtel 1988).

Critics

There have always been individuals critical of various cryptids—sea monsters, Bigfoot, and the like. That is fine and well. Even among cryptozoological investigators, there are debates over likelihood and purported evidence. What I am specifically addressing here are the attacks on cryptozoology as a methodology. These began in earnest after the formation of the International

Society of Cryptozoology and the publication of its first journal, *Cryptozoology*, in 1982. Of course, there were a few who derided Heuvelmans, Sanderson, and others prior to that point, but the ISC represented a formal surge in academic interest in cryptozoology, opening itself up to ridicule by traditionalists.

Two of the first attacks were almost simultaneous—Simpson's (1984) commentary on Heuvelmans' definition of cryptozoology, and May's (1984) review of the journal. Simpson's article is remarkable, in that it is little more than a lengthy tunnel-visioned diatribe on a straw-man argument. Simpson believed that the credibility of cryptozoology rested on the discovery of higher taxa. While some cryptids may be considered to represent potentially new or extinct genera, even a cursory examination of cryptozoological targets (Heuvelmans 1986; Shuker 1998) will perceive that numerous cryptids are, if they exist, certainly within known extant genera. This inability to understand cryptozoology comes through in Simpson's reworking of Cuvier's "rash dictum":

"There is some reasonable probability of the discovery of some living species of mammals objectively and taxonomically established, within the next few decades. There is a slighter probability of the discovery of decidedly new genera but here, too, there remains a possibility. The chances of any discovery of new living families are very slight. That new family taxa, including species and genera already known, will be proposed and named in the future is highly probable, but that will not be discovery in an acceptable sense. That really and entirely new taxa above the level of families will be discovered is improbable, approaching or reaching zero as the taxa are higher in the hierarchy of classification."

By attempting to eliminate species from the purview of cryptozoology, Simpson created the illusion that traditional survey methodology is the only methodology qualified for discovery. Simpson also fell back to emotional rhetoric when he addresses ABSMs: "It is simply incredible that so many educated people,

including professional zoologists and anthropologists, should have failed to produce any objective evidence that yetis or sasquatches do exist." A couple decades later, and noting that very few people, "educated" or otherwise, have actually attempted serious investigations into ABSMs, we do have a growing body of evidence, which, while not confirmative, does lend serious support to the idea that investigation should continue. We should certainly not be as dismissive of current evidence as Simpson was of the Patterson-Gimlin film—a "film of a supposed sasquatch could well be a hoax also" (Simpson 1984).

May's (1984) review of the journal *Cryptozoology* was constrained by his preconceptions of an "Alice-Through-The-Looking-Glass" science, as he see-sawed between applauding the writers who pointed out shortcomings and deriding those who have wasted their time even contemplating the possibility of remarkable new species. May mistook the first volume's articles (which primarily focused on ABSMs, aquatic unknowns, and "dinosaur-like" cryptids) as representative of cryptozoology's focus as a whole. Given that later issues included articles on such cryptid forms as lizards, snakes, fish, cephalopods, felines, bears, marsupials, and small carnivores, May's implication that cryptozoology is just interested in "human-like or dinosaur-like" cryptids was short-sighted. One of May's personal interests is biodiversity, as cited previously, and he "regrets" that efforts are wasted on cryptozoology rather than on "tropical plants, insects and other organisms that may be going extinct at a faster rate than they are being classified." The irony, of course, is that cryptids may well represent species that are in danger themselves.

The more recent attacks on cryptozoology come not so much from professionals, but from quasi-scientists advocating elitist skepticism. Shermer's (2003) recent article in *Scientific American* is a good example of forgetful induction. Shermer stated, "If such cryptids still survived in the hinterlands of North America and Asia, surely by now one would have turned up. So far all we have are the accounts." Besides avoiding the question of why exactly Bigfoot or any other large cryptid should have turned up by now, Shermer conveniently ignored evidence other than anecdotes, dismissing them as "blurry photographs, grainy videos."

Shermer's folly comes not from a critical approach—critical analysis is itself vital to cryptozoology—but from his naive notions of scientific progress. Shermer is so intent on creating a sterile error-free science that he has donned the role of Quixote, jousting at the colossal giants of his imagination, oblivious to the methodological nature of cryptozoology. One gets the distinct impression that Shermer is not so much trying to rid science of illogical thought, as that he is just trying to impress the "big boys." Does he acknowledge that progress requires effort and resources which surpass the superficial rodent-in-a-bucket-trap methodologies currently dominating traditional surveys?

Herein lies the distinction between someone who might, in fact, effectively wield scepticism to shear illogical thought and streamline scientific progress, and the skeptic who just stumbles around whacking anything that moves. Skeptics like Shermer are unwilling to stay the middle ground, because their status and self-esteem are based upon a compulsion to be right. They cannot settle for "I don't know." If there is no immediate resolution to a problem, they jump to "it must not exist."

When Shermer contends that discovered species do not turn out to be the typical media-represented cryptids, he neglects to consider that the latter ethnoknowns, through cultural, physical, and biogeographical impediments, are far more unlikely to be discovered through traditional methodology. John MacKinnon has helped discover several unique species over the last decade. Contemplating the possibility of a Sumatran mystery ape, he stated, "Sumatran rhinos are big, rare, and stupid, and I've never been able to see one despite spending years roaming around forests where they live. . . It would be a lot more difficult to see a sedapa, which is smaller, smarter, and just as rare. It's probably nocturnal, but without reflecting eyes, so your chances of seeing one would be minuscule" (McNeely and Wachtel 1988).

Shermer believes that cryptozoology only collects stories, thus his quoting of Sulloway—"Anecdotes do not make a science. Ten anecdotes are no better than one, and a hundred anecdotes are no better than ten." Shermer has found himself another straw man to burn. I hope that you, the reader, understand by now that anecdotes may stimulate an investigation, but cryptozoology focuses

on gathering objective evidence to confirm or refute a cryptid's biological existence.

Anecdotes do play an important role in observational natural history, and professional biologists use them when appropriate to suggest that a species or population may exist. Boyd and Stanfield's (1998) ran a statistical analysis on fishermen's sightings, suggesting that Caribbean monk seals may not be extinct. Sightings by native Egyptians, along with photographs and tracks, were significant in the proposal that a population of Barbary sheep still survives in that country (Wachner et al 2002). Schaller and Rabinowitz (1995) extensively surveyed Laotian villagers to evaluate the range of the saola in that country, noting that "the Saola is encountered so infrequently and has such a distinctive appearance that hunters and others remember for years the location and the details of a killing or sighting."

No serious investigator relies upon anecdotal information as completely accurate. Professional biologists recognize that locals may err inadvertently or purposefully. "Hunters may exaggerate animal population size for bravado, to impress the listener, or to justify hunting activity. Other hunters may minimize population size and withhold identification of the 'best' areas in order to detract attention from their areas of most success, both from researchers and competing hunters" (Henshaw 1997). Anecdotal evidence does, however, create a starting point for investigation. An excellent introduction to evaluating anecdotal cryptozoological evidence can be found in Eberhart's *Mysterious Creatures*, written by the pseudonymous Jack (Rabbit 2002).

What is more dangerous to cryptozoology is the intimation that cryptozoology is a waste of resources. Shermer's callow suggestion that "our limited exploratory resources" are too valuable for investigating cryptids belies an ignorance of the breadth and scope of traditional scientific research. Cryptozoological research spawns papers useful to traditional science (e.g., Guynn, et al 1985; Brussard 1986), and certainly furthers anthropological (ethnozoological) studies. Such skepticism dons the role of religion ("Thou shalt not..."), directly impeding zoological discovery. Joyner (1990) noted one such example—"The greatest authority of the time, Cuvier, went so far in his book *Le Rène Animal Distribué*

d'Après son Organisation of 1817 as to deny categorically the gorilla's existence, a condemnation repeated in the edition of 1829. He thereby retarded considerably the date of its discovery."

Once we understand that cryptozoology is a specific form of targeted-search methodology, one which targets ethnoknown animals, we can see the potential for significant interaction between amateurs and professional biologists. Cryptozoology should contribute to, and benefit from, the growth of targeted-search methodologies within traditional science. Several known but rare species (sometimes considered extinct) have been the focus of expeditions, and success is not always as easy as skeptics imply. One Indonesian megapode, *Aepyodius bruijnii*, considered "lost" for almost fifty years, was the target of 15 expeditions to Waigeo Island before ornithologists found a head and some bones in 2001 (Moeliker 2002). The poor success of searches for the southeast Asian kouprey ("amounting to little more than a couple of hundred pounds of bones and a few feet of grainy film footage" (Hendrix 1995)) is testimony to how large creatures can elude scientific scrutiny in the field. Schaller (1998) noted that anecdotal tales about a second species of wild pig in Laos precipitated the search for and rediscovery of *Sus bucculentus*.

One additional targeted-search methodology is the search for known species within conjectural ranges. After the discovery of the leaf deer, *Muntiacus putaoensis*, in Myanmar, Indian scientists searched for it in the forest hills of northeast India, finally using anecdotal and physical evidence to confirm its presence in Arunachal Pradesh (Datta, et al 2003).

At present, professional scientists are set within a range from strong interest to disinterest about cryptozoological subjects. In most cases, cryptozoology has no relevance to their work, so the attitude is often "wait and see." It appears, from speaking with a few other online discussion list moderators, that more than a few professional biologists are watching from the wings to see if amateurs come up with something interesting. I suspect this is how it will remain until either someone finally produces a body or a few of the more active degreed professionals decide to take responsibility for the creation of a new cryptozoological society.

Folklore Criticisms of Cryptozoology

One further group criticizes cryptozoology as a methodology. These are individuals who, recognizing the folkloric nature of cryptozoology, paint all reports as archetypes and folkloric motifs. These individuals, folklorist or not, assert that cryptids are monsters of the mind. Kirtley (1964) concluded, for example:

“Hairy, forest-dwelling dwarfs . . . , hermit human-beings, gorillas, apes, monkeys and bears, any or all, may have contributed to the legends’ multiple origins and may have figured in the experiences of persons who continually renew the fantasy through autobiographical anecdotes. The basic element of the legend seems to be the wild-man or demon-of-the-wilderness concept—the Yeti is merely a Central Asian localization of this almost universal motif—and mythopoeic minds, stimulated by fancy and tradition, seem to have embellished this central and not entirely incredible theme with complementary details, most of which are egregiously fabulous and are characteristically associated with those quaintly absurd demonic beings long since relegated to the conceptual realm of the nursery.”

Meurger and Gagnon (1988) argue that cryptozoologists and skeptics are bound to natural explanations. The former seek hidden natural causes; the latter reduce sightings to misinterpretations of natural events. These authors declare that appeal to Nature is based on contempt for folklore—skeptics call it superstition; cryptozoologists demythify it. Meurger and Gagnon dismiss objective reality within myths as unimportant (“the objective aspect of sightings are secondary in that they serve only as confirmation of belief”), then assert that objective reality has no right to intrude on the mythical landscape (“even if the current and the big fish exist, producing the facts . . . , they do not explain the original legend because they are weak rationalizations of them”). Because these folklorists see so many factors contributing to myth-making,

they aver that no distinct objective fact can be responsible for a sighting. Barring outright lies, though, even if folk beliefs influence sightings, sightings form around objective reality (environmental condition, misidentified species, biological unknown).

Meurger and Gagnon ignore that sightings are interpretations. They portray characteristics as impossible, not recognizing their own bias. "How can we admit the existence of the monster of Lake Memphrémagog, which one day displays the 'big scales' . . . and the next these strange 'pipes', and which can be seen as 'half-serpent, half-horse', a giant 'pike' and an 'alligator'? The only solution is cultural." They argue that this creature first emerged in folk belief as a serpent-horse, and gradually transformed into a giant fish as believers strained to secure it as a rational belief. One error here is that witness interpretations are based on characters rarely useful to systematic zoology. Just because a witness (or folk tradition) declares a creature to be snake-like does not mean that it must be a snake. Nor does cryptozoology deny that folk beliefs influence sightings, or that some cryptids may have no basis in biological reality. Recognizing that myth occurs is no excuse to deny the possibility of objective reality. Folklorists like Meurger and Gagnon make the unwarranted extrapolation that because some lake monsters have no biological reality, no lake monsters may have a biological reality.

Meurger and Gagnon then state, "No zoo can offer us the Disneyesque show of a family of *Nessiteras rhombopteryx* frolicking with pink balloons," ignoring that mythical creatures can be found in zoological gardens and aquariums. The fabulous gorilla (savage marauder and stealthy jungle killer) evaporated to leave behind a flesh-and-blood animal. The fear these authors possess is that reality diminishes the importance of myth. They confuse the roles of myth and reality, yet expect facts to play by folklore's rules.

Just as a fact can be construed anomalous as knowledge changes, so a cultural phenomenon will reflect folkloric attributes from different perspectives. Cryptids are folkloric, and yes, some occupy the cultural role of monsters, but the biological reality of mystery animals must be examined using objective data—not myth.

Certainly, folklorists are in no better position to rule on a cryptid's objective reality than someone coming from a biological

perspective—and most folklorists recognize this. Milligan (1990) contended, “While folklorists can discern some truths from these texts, the absolute truth about the core belief is no shining pearl that we can make emerge. That pearl remains obscure. Truth in most instances is a matter of faith not fact.” She suggested that folklorists remain neutral in the absence of incontrovertible evidence, because, in doing otherwise, folklorists themselves become myth-makers. Advocacy of belief, whether pushing one scientist’s speculation to the forefront of a debate or dismissing evidence of another sort, contributes to a legend rather than answering it.

There have been contentions by disenfranchised investigators that cryptozoology ignores the obvious folkloric nature of many sighting reports. Those investigators miss the point. In folklore studies, Goss (1992) stated, “It is a matter, not of whether the story contains a kernel of truth, but of how that story is told and the intention behind the telling of it.” It does not matter to a true folklorist whether a big cat or Bigfoot legend has a real animal at its core. Sightings can be investigated from both a biological and a folkloric perspective. This does mean an investigator should understand the basis for folkloric interest in mystery animals. Just as myths carry mystical elements, sightings carry baggage appended by special interest groups.

Campion-Vincent (1992) noted several parties which manipulate legends from their own perspective. The “bodies of social control,” *e.g.*, police or governing officials, having responsibility to keep law and order, usually declare they are taking the sightings seriously. Experts in science or wildlife form predictable conclusions about the sightings—usually misidentifications or free-ranging exotics. Farmers will, especially in the aftermath of livestock damage, focus on their loss. Hunters participating in organized searches emphasize their own usefulness. Nature protectors attack the hunters’ role, defend the animal, and emphasize the irresponsible behavior of people who keep exotic animals.

Journalism itself is one principal factor in legend-building. Goss (1992) observed, “Looking at the stereotyped format and stereotyped description of the reports, it is easy to see evidence of a news-media process which not only standardizes accounts, but which may encourage people to misidentify other fleetingly-

perceived animals . . . The reports may raise expectation to the point of *causing* someone to think that what they saw was a puma; the same reports may influence the wording of the animal's description when the witness is interviewed afterwards."

These characteristic components of mystery animal newspaper accounts were delineated by Goss (1992):

1. An eyewitness, usually named, is stated to have encountered the strange animal.
2. The setting for the encounter is usually an open space—often rural, sometimes suburban or urban.
3. The sighting is usually brief.
4. The description of the animal varies, but Goss noted, "References to particular species which appear in newspaper accounts . . . sound more like journalistic terms of convenience than strict zoological labels." The witness' ability and qualifications to identify the animal are usually glossed over.
5. Other sightings in the same area are noted, whether they were recent or decades past.
6. As sightings continue, a popular name will often be given to provide local identity.
7. Stated or not, the animal is assumed to be, or possibly be, dangerous, especially to children and pets.
8. Physical evidence (pawprints, livestock damage, hair, feces, animal kills) are often cited. Goss stated that photographs were rarely provided in his study, but that may not hold true today. The proliferation of small cameras has led to a number of purported photographs and video images in the past few years.
9. Authority figures will be quoted, usually in reassuring tones. Skeptical responses will be included to add balance to the article.
10. The favored explanation is a feral exotic animal, though the original owner is rarely found.
11. Organized hunts for the animal start out enthusiastically, but rarely locate the quarry. The futility

lends to the mystery of the animal, even when the habitat is such that no expectations of success should be made.

12. The animal drops from sight and the newspaper stories end. "We cannot rule out the possibility that newspaper editors grow tired of such stories and begin to doubt their long-term audience appeal within a few days" (Goss 1992).

By understanding that newspaper accounts are themselves a form of folk-legend, we can learn to distinguish between folkloric patterns and what might actually be happening.

Cryptozoology as Belief Mechanism

Cryptozoological investigators should be aware of one method by which skeptics perpetuate the fallacious role of cryptozoology as a belief mechanism. Under the banner of sociology, skeptics poll individuals, be they students or the general public, to determine the level of belief in assumed pseudoscientific phenomena. The percentage of statements checked "I believe" among unproven phenomena is then calculated, leading to pedantic ranting and calls for the improvement of educational systems.

It should be immediately obvious that this is legend-making of extensive proportions. The use of "I believe" versus "I disbelieve" violates the fallacy of false alternatives. By using only two belief states, legitimate alternative expressions are filtered out. "I believe that Bigfoot has not yet been proven to exist," is a reasonable position, and one who holds that assertion should not be forced to devolve to "I believe that Bigfoot exists," or "I do not believe that Bigfoot exists." Even the position of "I believe Bigfoot cannot be proven to exist" is a valid, if debatable, belief state.

Cryptozoology does not focus on belief states. We investigate knowing that sufficient physical evidence transcends pseudo-intellectual barriers. Now, belief states by witnesses should be considered when evaluating sighting reports. Belief states can be altered by educational background, hearsay, and other factors

(Jilek-Aall 1972), and those beliefs influence a witness' perspective and testimony. We do not, however, rely solely upon witnesses' beliefs when evaluating the possibility that a species exists.

Paranormalism

One distraction in cryptozoology is the occasional outbreak of paranormalism. Paranormalism is a sister path to skepticism—a direct response to the spurious claim that if the cryptid existed as a biological entity, we would have confirmation by now. Starting from that false assumption, skepticism takes the road of “it is unlikely to exist,” while paranormalism travels to “it is likely to be paranormal, rather than biological.” Paranormalism is not the investigation of alleged paranormal activities; there are individuals who do so critically and within scientific parameters. Rather, it is the leap to paranormal suppositions when physical, psychological, or social conditions are capable of explaining an event. Just because an investigator does not immediately have an answer at hand does not mean that an answer cannot be found.

Paranormalists pick out a handful of reports which they believe support their ideas. Quite often, the characteristics used to support the paranormal nature of the event can, upon scrutiny, be shown to be well within the parameters of physical possibility. For example, a witness may state that night sounds ceased during the sighting event, or they were unable to hear the creature move through the forest. One common theme is that the animal was impervious to bullets. None of these characteristics is outside the realm of physical plausibility. Rather, they are often based on false premises from the start. Some orthopterous insects undergo cycles of vocalization or silence depending upon ambient light intensity (Fischer 2001). Large creatures do not always trample through the forest like humans—African safari hunters have noted that elephants can surprise a man in thick brush. Sanderson's article in Appendix I discusses firearm requirements for large primates, and why some guns will rarely prove effective.

Additionally, we may notice a trend between personality and proclivity towards paranormalism. Some personality types seek

personal attention, and use paranormalism as a way to debate and distract researchers. (Similar attention-seeking behavior can be observed in some individuals claiming multiple sightings of cryptids. It is usually progressive, as stranger sightings are reported or as photos and video recordings of blurred figures or obvious hoaxes are produced. Multiple sightings do not prove that a witness is lying or impaired, but they do serve as a caution.) We should not allow an imperfect knowledge of the natural world to compel us into paranormal pretexts. Either a cryptid exists as a biological organism, or it does not. If it does not exist as a biological organism, it falls outside the purview of cryptozoology. Confusing unknowns with unknowables fosters a veneration of mystery for the sake of mystery. Claims that "mystery enhances our lives" ignore science's progression from one puzzle to the next—we are not about to run out of mysteries.

Speculation

So, what is speculation?

Speculation creates and develops new ideas. It does not, in and of itself, answer questions. Rather, it uncovers new directions for investigation. We still must critically examine these emerging ideas—as G. K. Chesterton declared, we open our minds in order to shut them again on something more substantial.

Key characteristics of scientific creativity include (Hurley 1997):

- There is no distinct objective.
- There is no absolute methodology.
- There is no means to prove it in advance.
- It can be confusing and uncertain.
- It is risky, and mistakes will occur.
- Its path is unpredictable.
- It is often rejected as impossible or impractical.

Speculation admits us to territories ignored by logical deduction. Questions are our guide, rationality is our companion; but we must walk the paths, and not pretend they don't exist.

CHAPTER NINE

Long-Tailed Wildcats

While looking for biological puzzles here in Pennsylvania, I ran across an interesting booklet by folklore-collector Henry W. Shoemaker (1922a). It detailed the capture of an unusual bobcat-like feline—unusual, in that its tail wasn't bobbed in the slightest. Shoemaker suggested that this marked the presence of the European wildcat in North America. This booklet, now public domain, mixes fact and speculation, but is worth examining.

Felis catus in Pennsylvania?

For years the writer has heard the persistent under-current of rumors that *Felis Catus*, or some allied type of long-tailed wild cat was an early inhabitant of the Pennsylvania forests. Frankly he did not believe these stories, thinking that the animals in question were either feral house cats or young of *Felis Cougar*. The recent capture of a specimen in Tinicum Township, Bucks County, its description and photographing, all make it seem as if, after all, there was a long tailed wild cat in Pennsylvania, along with the Panther (*Felis Cougar*), the Canada Lynx (*Lynx Canadensis*) and the Bob Cat (*Lynx Rufus*). As the heathcock, the Carolina Paroquet and the Moose Jay ("Camp Robber") were exterminated in Pennsylvania before they were generally included in our lists of wild life, and although the wolf has been extinct less than a third of a century, not a skin

or bone remains, it is possible that the long-tailed wild cat or 'coon cat, never a plentiful animal, and of nocturnal habits was wiped out of existence without being recorded in our natural history. Appended hereto are the contemporary newspaper accounts of the capture of the wild cat, taken from the "Bucks County News" of Doylestown, Pa., which seem to be unusually clear and comprehensive, while for frontispiece appears photographs of the specimen, taken by State Game Warden Warren Fretz, of Doylestown.

It seems a great pity that this animal was not kept alive, but it is hoped that if the mate is ever taken, its life will be spared for the benefit of science and the joy of nature-lovers. In this connection it may be well to quote statements of some competent Pennsylvania sportsmen and naturalists on the subject of the coon-tailed wild cat in this State:

C. H. Shearer, Artist, of Tuckerton, Berks County, born in 1846, says: "When I was a boy the long-tailed wild cat inhabited the range of mountains which culminates at Mount Penn, above Reading. I have caught three of them in my time in Irish Gap, say about 1857 or 1858, two by a hind foot, and one by a front foot. I always dreaded to get them in my traps as they fought so fiercely and were hard to kill. They were larger than the biggest domestic cats, their winter coat very fluffy, their faces were broad and the tails were beautifully ringed. I was never sure if they were a native wild animal, or were brought over by early Colonists from Europe, or else were tame house cats gone wild, in the third or fourth generation. I have sketched them, and remember their appearance as clearly as if it were yesterday."

Chauncey E. Logue, State wild animal trapper, of Woolrich, Clinton County, born on First Fork of Sinnemahoning Creek, in 1870, and probably the leading bob cat hunter of his generation says: "The

older people where I was brought up, it was a wild region up to twenty years ago, always gave me to understand there was a fourth species of the cat family in Pennsylvania, a long-tailed wild cat. As a small boy I saw the carcasses of several that had been killed by hunters, and my recollection is clearly that they were not like house cats that took to the woods." Emmanuel Harman, hunter, of Mt. Zion, Clinton County, born in 1832, who died several years ago said: "Young panthers were sometimes found in the woods by the early settlers and because of their long tails, called 'wild cats', but there was also a true wild cat in the Pennsylvania mountains, with a long tail, clearly marked and barred; these I have seen and helped to kill several times when I was a boy." George A. Betzer, State Game Protector, of White Deer Mountain, Lycoming County, born in 1862, says: "As a boy in Snyder County, in the mountains I always heard the old hunters say that there were still a few long-tailed wild cats left, of a race fairly plentiful when the first settlers came in, but quickly killed off or driven away. Once while on a hunt I helped to kill a magnificent long-tailed wild cat; it ran up a tree and out on a limb, and we shot it. I examined it closely, and it was anything but like a domestic cat that becomes wild. I have seen many domestic cats that took to the woods, they are great game destroyers, and I have killed them, but there are differences about the size of the head and body which allow no mistakes being made by a careful observer." It will be indeed interesting if a form of *Felis Catus* can be added to the list of our Pennsylvania *fauna* at this late date and it will show that science never stands still, that there are constant rewards in store for the seekers after knowledge. It is hoped that the publication of this little pamphlet will have the effect of shedding further light on the question, and that communications

will come in from experienced hunters and trappers, who will by the weight of their evidence either prove or disprove this important and interesting topic. Just because natural histories, often the work of parlor or professional naturalists, who do not dare deviate from the hewn path of their equally indoor predecessors, declare that such and such an animal or bird does not exist or never existed, probably several species have been lost or confused in Pennsylvania faunal history—cases in point are the Black Moose, and the Bison, now clearly established as a part of our list of mammals within the past two hundred years.

Henry W. Shoemaker,
Altoona Tribune Office, May 6, 1922.

Wild Cat Caught In Tinicum Twp.
Rare Animal, Supposed to Be Nearly Extinct,
Trapped by 16-Year-Old Lad
Sportsmen To See It Here

A genuine wild cat, a species of animal that is now said to be very rare in this country, was trapped and killed on Monday, January 16, by Tunis Brady, the 16-year-old son of Joseph Brady, on the Cook premises, on the edge of the State Auxiliary game preserve in the Tinicum Swamp, this county. With the possible exception of two similar animals killed about two years ago by a son of Daniel Trouts in the same locality, this is probably the first wild cat known to be taken in Bucks county for nearly three-quarters of a century. The last wild cat shot in central Bucks county was killed on Spruce Hill, about a mile below Chalfont fifteen or twenty years before the Civil War. This capture is said to be the only authenticated taking of a wild cat anywhere in the county until

the capture last Monday—but the Spruce Hill cat may have been a bob cat.

The carcass of the Nockamixon cat is now in the possession of Game Protector Warren Fretz, who will exhibit it at the annual meeting and smoker of the Bucks County Fish, Game and Forestry Association next Tuesday night, when it will no doubt be an object of great curiosity to the sportsmen.

Terrified the Neighborhood

For three years residents in the vicinity of the Auxiliary Game Preserve have known of the presence of some strange wild animal in the vicinity, which uttered “unearthly” yells at night. So terrifying were the cries of this animal that timid women in that sparsely settled part of the county were afraid to go out of the house at night. Young Brady tracked two strange animals a few weeks ago to a den in some huge rocks near his home on the Cook place and set a trap with the idea of capturing them. Three times they sprung the traps without being caught.

Put Up a Big Fight

Last Monday the animals were less fortunate and one of them, the male, was securely caught with one hind foot and one front foot in the trap. When Brady went to look at the traps in the morning and found that he had captured some animal, he attempted to kill it with a club, but the animal put up such a terrific fight that the boy thought it would break the trap-chain and escape. He then procured a rifle and killed it with several shots in the head. It was the male cat, and its companion, believed to be a female, is still under the rocks.

Not a Domestic “Wild” Cat

The captured animal is not a domestic cat gone back to a wild state, but is, without much doubt a

distinct species—a genuine wild cat. It is not a bob cat nor a Canada lynx, nor is it a cross between these two animals, as some people have pronounced it. It corresponds exactly with the description of the wild cat contained in Dr. J. G. Wood's "Natural History," and it occupied precisely the habitat which Dr. Wood says the wild cat frequents, "rocky and woody country, making its home in the cleft of some rocks," a place just like that in which this wild cat was captured.

The Cat's Measurements

The animal captured in Nockamixon has strong and powerful claws and teeth, and its head is large in proportion to its body. It apparently has not an ounce of surplus flesh, being sinewy and wiry, and yet it weighs eight and a half pounds. Its length from the tip of his nose to the tip of its tail is 30 inches. Its body length is 20 inches and it stands 13 inches high. Its front legs are 7 inches long and its back legs 13 inches. Its head measures 11 inches in circumference the broad way and 13 1/2 inches the long way. It measures 3 inches between the ears and 7 inches across the ears. Its body is 12 inches around just behind its forelegs and 14 1/2 inches around the centre. Its tail is scant 11 inches long, thick and inclined to be bushy, which distinguishes it from the domestic cat, which has a long tapering tail.

Its Peculiar Markings

Its markings are precisely those Dr. Wood describes for the wild cat—the fur being a sandy gray, with some yellow or buffy color, the buff color being particularly noticeable on the body under the hind legs. A dark line extends from the shoulders along the spine to the end of the tail. It has black "tiger" markings on the body, legs and tail. The black stripes extend entirely around the body and hind legs. On the front

legs the black bands run into black patches on the under side.

The top of the head is black, and the face grey, marked with regular black lines. The "whiskers" or "feelers" are white, stiff and bristly and rather abundant. The chin and neck are lighter gray than the rest of the body and also buffy, with a median transverse double half-moon brown line. The throat has a conspicuous white spot.

The tail is of the prevailing gray color, ringed with bands of black, and has a long black tip, the whole resembling a raccoon's tail. The dark markings on the animal are not uniform in intensity, but they contrast with the grey with sufficient strength to make it a very striking-looking beast.

Distribution of the Wild Cat

The wild cat, though little known here, is widely spread, being found not only in this country, but in the British Isles, Continental Europe, Northern Asia and Nepaul, though it is not as common anywhere now as it once was. It has been claimed that it is a native of Ireland, though this is disputed. It is sometimes called the British tiger, though it now is seldom found in England.

It has been claimed that the domestic cat originated from the wild cat, but this theory has been rejected by most scientific investigators. Domestic cats sometimes revert to wild life, but no matter how many generations they continue wild, there are still certain distinctions between the wild domestic cat and the wild cat. Some naturalists claim that our race of domestic cats originated from the Egyptian cat, which more nearly resembles the domestic cat than the wild cat, but, while this theory is highly probable, it has never been satisfactorily proven.

The capture of the Nockamixon wild cat is likely to cause a stir in scientific circles, because of the

rarity of the incident. It is believed that there are several more of his breed in the same territory. In fact the animal is now so little known that some recently published natural histories do not even mention it—*Bucks County News*, January 20, 1922.

Tinicum Wild Cat Discussion

Capture of European Species Raises Question
of Its American Nativity
Great Interest In "Find"

The publication of the story yesterday in the Bucks County Daily News of the capture of an European wild cat in the Tinicum swamp by Tunis Brady, a sixteen-year-old resident on one of the tracts included in the Bucks County Fish, Game and Forestry Association's Auxiliary Preserve created great interest locally and among naturalists generally. It is also likely to raise a controversy as to whether or not the European wild cat is a native of this country. Dr. Wood, the author of the British work on natural history, quoted in yesterday's story, mentions this animal as being found in 'this country,' but he clearly means England and not America.

Should Be Investigated

Instead of becoming a matter of controversy the question as to whether the European wild cat is indigenous to America ought to be a matter for serious and careful investigation. Present day American writers on natural history do not mention the European wild cat as a member of the native fauna. While admitting that the animal captured in Tinicum may be the European wild cat (*Felis catus*), they say it is probably an escape from a menagerie and does not belong to this country's fauna.

There are others, however, who believe that the

Felis catus is an American animal; that in the early settlement of this country it was somewhat common, but, as it does not stand persisting hunting, had become practically extinct over a large area of the country. These claimants say that it has escaped notice in recent years because it so closely resembles the "tiger" type of domestic cat, and that hunters who have killed them in modern days have never brought them to the attention of naturalists because they thought them domestic cats, and thus they have escaped the attention of naturalists.

Naturalists May Have Overlooked It

Dr. Henry C. Mercer, of Doylestown, who saw the animal killed in Tinicum not only says that the specimen is an European wild cat, but is inclined to the opinion that the animals are indigenous to this country. He cites a quotation from Oliver Goldsmith's "History of Animated Nature," in which Goldsmith states that Columbus was shown one of these wild cats by a hunter who killed it on this side of the Atlantic.

Well Established in Tinicum

It may be difficult to prove now that this animal is native to America. There is not much doubt, however, that it has become thoroughly established in the Tinicum Swamp. Residents in the vicinity have known of the existence of strange animals there for several years. Two similar animals were killed in that territory between two and three years ago, while the one trapped this week had a mate which is still in hiding in the rocky fastnesses of the swamp region.

The specimen captured on January 16 is still in the possession of Game Protector Fretz, who has called the attention of Dr. Woodruff, a noted naturalist of this State, to the capture. The animal will be exhibited

at the annual meeting and smoker of the Bucks County Fish, Game and Forestry Association in the Sixth Regiment Armory next Tuesday night, after which it will be placed in the hands of a taxidermist for mounting.—*Bucks County News*, January 21, 1922.

Tinicum Cat True Wild Cat

Species Not So Near Extinct as Many Naturalists Think
Its Habits Are Nocturnal

By Miss Elizabeth C. Cox, of Holicong

I have been very much interested in the Wild Cat, caught in the Tinicum swamp. I went to see it and was much surprised to read that the sportsmen generally pronounced it a "domestic cat."

Species Not Nearly Extinct

Instances that have come to my knowledge lead me to believe that it is a wild cat, and that the species is not so nearly extinct as is suggested. Years ago I read a book entitled "Early Settlers in Canada." It was a very old book, the story of an English family who settled in central Canada, while that country was a trackless wilderness. One night one of the boys of the family shot an animal in a tree near the house. When they examined it, they think it a domestic cat, but an old man, a hunter and trapper, who has spent practically all his life in the forest, tells them that it is a wild cat, that while it is smaller than either the Canadian lynx or the more common bobcat, it is much more fierce than either of them and cannot be tamed, and the reason they have not encountered it before is because it is entirely nocturnal in its habits. The description of the animal, in the book, as I remember it tallies perfectly with the specimen in Mr. Fretz's possession.

One in the Philadelphia Zoo

One time at the Philadelphia Zoo they had in a small cage an animal ticketed "Indian Devil." When I first saw it it was curled up asleep, and looked like a large house cat, but when aroused it jumped against the bars of the cage hissing and spitting, with ears laid close to its head, bit at the bars and seemed in a perfect frenzy to attack us.

Some time afterwards, when visiting the zoo, I asked an old man, who was working about the garden, if he remembered the "Indian Devil."

"Oh yes," he said; "it was one of them wild cats out of the Blue Ridge Mountains. It soon died. You can't keep 'em in captivity. Why, that beast just spent every night while it lived buttin' its head agin the bars tryin' to git out. It eat enough, but it just killed itself tryin' to git away."

As I remember the cat at the zoo it was not quite as distinctly striped as Mr. Fretz's cat, and was, perhaps, a little larger. But it had the same large round head, flat ears and short ringed tail.

Found in Fayette County

A lady whose home was at one time on the summit of Chestnut Ridge, a spur of the Allegheny Mountains, in Fayette county, Pennsylvania, tells me that these long-tailed wild cats are by no means uncommon there; that often in driving at night they would see a wild cat cross the road in front of the car, taking his time and staring at the lights as he went. She says she never knew them to attack anyone, but that when they drove in a carriage they always carried a pistol as a protection against wildcats, and that they were always warned that if they had meat in the carriage and encountered a wild cat to throw the meat to it and get away as fast as possible.

(Miss Cox's contribution to the Wild Cat question is very interesting and valuable. Miss Cox is one of

the most careful investigators and most conscientious naturalists in Bucks county, and her opinion and the facts she relates should have much weight. It is to be hoped that other naturalists will make similar inquiries.—Editor.)—*Bucks County News*. January. 1922.

Shoemaker's booklet certainly suggests that a distinctive animal was being seen, but much of the information given cannot be confirmed. Unfortunately, the specimen has apparently been lost, and the Pennsylvania State Museum has no record of any similar accession. Perhaps it was given to one of the state's smaller museums? The Philadelphia Zoo library did not have any records of an "Indian Devil" wildcat when I queried them. ("Indian Devil," incidentally, is an old vernacular name given to several different species, including cougar and wolverine.) My attempts to locate any book titled *Early Settlers in Canada* have been unsuccessful.

These are not, however, the only reported cases of long-tailed wildcats in Pennsylvania's forests. Prior to 1840, Burrell Lyman of Roulet, PA, shot two "bobcats" with long tails. In September, 1951, Lynn Wycoff trapped a wildcat with a foot-long tail south of Wharton, PA. The cat was kept alive, but never tamed down. "Hundreds of persons saw the captured animal but nobody seemed to know what it was. All agreed that it was a nasty tempered, snarling beast" (Lyman 1973). After three months, Wycoff stated, "It is a big cat now. Nobody can tell me that it is a bobcat. Their color lightens as they grow older but this animal's color has not changed."

A similar feline was also described in the *Pennsylvania Game News* of June, 1934:

A Wild Tame Cat?

We were sitting around the large egg-stove in the hunting lodge of the Little Sanders Springs Camp. This hunting lodge is situated in the huge swale at the head of Foley's Draft, in the mountains about eight miles from Driftwood, a dilapidated

town reminiscent of the great lumber days in this region. The stories were flying fast, some true, and some tainted with white lies hunters are apt to tell. Finally several of the boys made a break in the tales by getting up and going outside for a breath of fresh air and to limber up their legs, which were stiff from the day's hike. (We were hunting bear that day.)

On returning from outside they reported hearing a peculiar meowing. It sounded as if it was the noise of a kitten. Then, again and again, the same weak meow was heard in the lull between stories.

One of the automobiles returned to camp from a trip to the town to pick up a battery which had gone dead. Work progressed rapidly on replacing the charged battery, for some of the fellows expected to break camp and return home for Sunday. The hunter holding the lantern shouted, "There he is."

"There is what?" was the answer from the others.

"The two eyes that were making the meow we heard before," he replied.

Sure enough, out of the darkness shone two balls of fire. The other hunters in the camp rushed to the door.

"Get your gun, Frank," shouted Ray, "I don't want to go out in the snow in my slippers."

Frank reached for his 20 gauge and slipped in a few shells.

"Flash him again " Frank asked.

"There he is," replied Chick, "get him."

"Hold that flash on him."

Meow—then a long hard meow. It turned, stopped and turned around again "Flash him again."

Bang!—spouted Frank's gun.

"You got him."

With the aid of a long rattlesnake club Chick removed the animal. First came the head, then the shoulders, the long body, the tail. Everyone was astonished at the size of the cat.

"It's a wildcat."

"No, it's a tame cat gone wild."

"Its tail is too long for a true wild cat," said Chick.

"Yes, but look at the tusks, and the broad face, and its eyes are too large, and its ears have the lashes of a wild cat," remonstrated Ray.

"Sure he's a wild cat," assured Frank.

Then the bets were on. What was this animal? It tested the hunter's knowledge of Pennsylvania's wild animals.

After consulting several experts on wild life, and after all was said and done, the animal turned out to be a male cat, 37 inches long from the tip of his nose to the end of his tail and weighing 13 pounds. The head was large, the face was flat and blunt, with long whiskers, protruding tusks, and sharply pointed ears, which had long black tufts on the tips. The shoulders were broad, the body stout, the tail long. The color markings were light yellowish brown on his stomach, with dark spots. The back was dark brownish tan, with dark stripes. The tail was about eight inches long, dark brown with black rings.

The final conclusions were: cross between a wildcat and a common house (tiger) cat.

How much small game would an animal like this destroy during the nesting season in the spring? in a week? in a month? In a year? in comparison with a hunter, who only kills during hunting season? How large a territory would this animal cover? How would it get into the woods in the first place?

In 1951, Shoemaker wrote an article, "'Pennsylvania wildcats' brought down to date." I was able to read the original typed copy in the Shoemaker files at the Lycoming County, Pennsylvania, historical society, but do not know if he actually published it. In it, Shoemaker noted that one hunter, Clemuel F. Herlacher, cam-

paigned in the late 1800s against the idea of long-tailed wildcats, which he believed were just young cougars. These young *painters* (or *benders*, in the Pennsylvania Dutch), were occasionally shot and exhibited as true wildcats. Unfortunately, I am unable to reprint the photographs which accompany both Shoemaker's 1922 booklet and the *Pennsylvania Game News* article. Suffice it to say, neither feline is a juvenile cougar. That may indeed have been a common mistake in the 1800s, as *panther*, *mountain cat*, and other colloquialisms were slapped on any feline that moved. For the twentieth century reports, another answer must be found.

There are three basic paths for speculation with these cats—feral domestic cats, distinct species, or hybrids?

Ferals—In a review of feral domestic cats, McKnight (1964) noted that wild littering by domestics is uncommon beyond the temperate ranges. Most "wild" domestics are part of a continuous drift of homeless strays from towns into the rural areas. McKnight's survey of the literature suggested that most feral cats are "only rarely found far from human habitation, even though they may have little or no direct contact with man." The diet of these cats, from numerous studies, is primarily rodent and rabbit, with birds becoming significant prey only during nesting periods. One interesting point was that "cats, particularly toms, that have lived for several years or generations in the wild may grow to be larger and heavier. Many reports were received of cats that weighed more than 12 pounds, and a few that scaled twice that. And the longer a cat lives in the wild, the wilder it becomes. A half dozen instances were reported of feral cats unhesitatingly attacking humans who bothered them" (McKnight 1964).

The only real difficulty with these reported felines being feral domestics is the relative similarity to bobcats—flat faces, coloration, etc. The mention of ringed tails with both specimens suggests, though does not confirm, a similar origin. Neither temperament or size can be used to gauge "wild" versus feral. The problem with external characteristics is exemplified in the cat breeding culture. Several breeds of cats are purported to be bobcat hybrids, but have little more than "it looks like a hybrid" to support the hype. In some cases, the "wild" genetic markers can't be found,

so the breeders use some misbegotten genetic mumbo-jumbo to try and bolster the case. Rarely will you find a breeder citing published scientific documentation. The fact is, many traits can be specifically bred into a domestic cat, and certain mutations create offspring which look like "wild" cats.

New species—It would be intriguing, if not sad, to see a species slip away just because it cannot be differentiated from a domestic feline. Surprisingly, differentiation within the smaller cats is not an uncommon problem for zoologists, as external characters between species or even genera can be confusing (García-Perea 2002). At this point, while there appears to be knowledge of a long-tailed wildcat from the early settlers in Pennsylvania, I am not aware of any corresponding knowledge from Native American groups of the northeast or Mid-Atlantic regions.

Hybrid felines—Could these long-tailed wildcats be hybrids between domestic cats and bobcats (the most obvious hybrid possibility)? Bobcats have recently been shown to hybridize with lynx in the wild (FWS 2003), and domestic cats are known to mate with Scottish wildcats (French, et al, 1988), but how common would it be for a bobcat to mate with a domestic cat?

I had written the Pennsylvania Game Commission's bobcat specialist, Dr. Matthew Lovallo, to see whether the PGC might have specimens of such hybrids. While no hybrid cats are in the PGC collections, Dr. Lovallo kindly provided citations for two papers on possible hybridization. Young (1958) noted a possible mating from Texas, and a litter from North Dakota. The seven kittens from the latter exhibited two distinct forms—black normal kittens with largish paws, and speckled gray, bob-tailed, tuft-eared kittens. Gashwiler, et al (1961), noted a possible bobcat-domestic litter from Utah. The kittens included two ordinary yellow long-tailed kittens, and three dark kittens with short tails, tufted ears, and white bellies. Unfortunately, these reports are all from the period before genetic evaluation could be made. I am not aware of any recent studies evaluating possible bobcat-domestic hybrids.

Can hybrids show a relatively stable and distinctive morphotype? One of the few evaluations of a wild-ranging feline

hybrid was Shuker's (1990) review of Scotland's Kellas cat—a melanistic, gracile hybrid of the domestic cat and the Scottish wildcat. Ben Willis, a North Carolina investigator, has proposed that a melanistic hybrid can be found in that state, while Hartwell (2003) has noted multiple accounts of "rabbit-headed" cats from an area in Scotland. The known cases of domestic-bobcat hybrids did not show a common stability, but a regional population with recurrent inbreeding might have a better chance.

I have not come across many reports of long-tailed wildcats outside of Pennsylvania, but there are a few. As noted, external characteristics are not enough to determine exact species when you only get a quick look at an animal. One interesting report was noted by Dr. Robert Giles, Jr., Professor Emeritus of the College of Natural Resource at Virginia Tech. Giles (n.d.) mentioned in an online textbook for forestry professionals that he had once seen "a long-tailed bobcat on a remote mountain in a car headlight beam," chalking it up to a large feral cat. Dr. Giles kindly provided me with the details on this report:

"My cat observation was in 1959 and memory fails. I was a new wildlife biologist for the state and several weeks before the 'cat' night a game manager has showed me the tail with color bands of what he said was a long-tailed bob cat. I knew that the 'new boy on the block' would get teased so I was skeptical. The feel of the hair was more coarse than house cats but I left, joking about it (but still thinking it feasible).

"In the winter, no leaves, I drove on Rt. 311 from Covington to Blacksburg for a meeting and on Potts Mountain saw run in the car headlights a gray animal the size of a large house cat. I think I saw the tail and assume I was recalling the 'long-tailed bobcat' phrase. It was not a cougar; it was larger than a house cat. It was not a opossum or raccoon. The location is very far from any houses and at high elevation. A cat of any type here has to be feral or just thrown out of the car for 'return to the wild,' an atrocious act. I'd seen very large house cats trapped from the wild."

Nature photographer Tim Ernst (2003) has also described in an online journal his sighting of a "long-tailed bobcat" which took place near his cabin in Arkansas.

Any future research must include a means of evaluating the feline using genetic markers. While earlier studies may have relied upon morphological characters, this is a very tricky area when domestic felines exhibit such wide variability. I suggest talking to trappers who may accidentally capture "feral cats" far from human habitation. They may be willing to provide hairs or full specimens for research. Hair traps could also be used in targeted areas, but care must be made to use lures that don't invite raccoons and other species.

Investigators should watch for other cases where unusual small (*i.e.*, smaller than cougar) felines are reported. I received the following email account from a man who ran across *NABR*:

"I am a Geologist with a Master's Degree and am skeptical of many 'crypto' creatures, but I will relate one that I believe has some merit.

"I got my MS at Southern Illinois University at Carbondale, which is just north of the massive Shawnee Nat'l. Forest. The locals talk of a 'woods cat' or sometimes a 'timber cat,' much bigger than a housecat but with a long tail, so definitely not a bobcat—we have a few of those too, most people know them by sight. These 'woods cats' are anywhere from brown to tiger striped, and about the size of cocker spaniel—say 25-30 lbs. I ran into a taxidermist in Olney, Illinois, a rural So. Illinois town, who claims he mounted one for a guy many years ago—he was about 80 years old in 1985, when this conversation took place, plus or minus a year or two. He claimed that he was aware of them as a boy, and his father told him that the Indians had brought them up from Mexico. I later took him a book that had a picture of a jaguarundi in it and he said 'that's it!' Lots of good people in southern Illinois

claim to have seen these. As a geologist who works in the oil fields, I get in some remote backcountry quite a bit, and I make a point of asking farmers or rural residents about these cats—MANY have personally seen them.

"They may just be feral cats, but I thought I would write you to let you know in case you didn't have any knowledge of these critters."

CHAPTER TEN

The West Virginia Roc

As you become familiar with cryptids from around the world, you will see certain stories repeatedly offered as anecdotal evidence for particular mystery animals. The following newspaper account, kindly supplied by investigator Gary Mangiacopra, is one such tale. It is a sad story—one which vividly brings to mind the emotions of devastated parents who lose a child. It comes from the February 24, 1895, Sunday morning issue of the St. Louis, Missouri, *Daily Globe-Democrat*:

A Modern Roc.

West Virginia Mountaineers Terrorized
by a Gigantic Bird.

A Ten-Year-Old Child Carried Off
by the Feathered Monster—A Hunter's
Terrible Battle—What a Deputy
Sheriff Saw—The Bird's Home.

Special Correspondence of the *Globe-Democrat*.

Addison, Webster County, W. VA., February 14.—Not since the treacherous Gauley River rose suddenly in the night and swept scores of the mountaineers living along its banks to death in its icy waters, has Webster County been so excited as it is at present. From away down on Cherry River to the remotest settlements on Sugar Run, in the upper part of the county, the mountaineers are talking of

the gigantic bird which has been terrorizing this section for the past week or ten days.

About two weeks ago a child of Dan Junkins, who lives over on Bergoo, some fifteen miles from the place, suddenly disappeared in a manner which for a time puzzled the oldest hunters and woodsmen of the county. It is now regarded as an absolute certainty that the child, a little girl of 10 years, fell a prey to the winged monstrosity which for want of a better name, the mountaineers call an eagle.

Little Landy was sent by her mother one Friday afternoon to the cabin of Joe Warnick, a mile and a half south of that of Junkins', to ask after Mrs. Warnick, who had been sick. The girl started soon after noon for the Warnick cabin, but never reached there, and vanished as completely as if she had been spirited away by supernatural power. As Landy did not return by 4 or 5 o'clock, Mrs. Junkins grew uneasy, and sent her husband to look for her. He thought, perhaps, she had remained with the Warnicks, and went straight to the cabin. There he learned that the child had not been there. By that time it had become dark, and assisted by the Warnicks, Junkins started to hunt his daughter. Nothing could be seen of her, and the whole party returned to the Junkins cabin. As there were several inches of snow on the ground, the tracks of Landy could be plainly followed. They were followed to a point within half a mile of the Warnick cabin, where they suddenly disappeared, and could not be seen any further. The point where they stopped was in a cleared field, where buckwheat had been grown last season. The child must evidently have been frightened at something, for the tracks left the path, and where they stopped were some 15 or 20 feet away from it. There were a number of her tracks together, as if trying to avoid something. Beyond this point the footprints disappeared. The search was

continued far into the night, and the surrounding forest was scoured as far as possible, as it was thought the child might have wandered from the path. The searchers were compelled to return to the almost distracted mother with the news that the missing child had not been found.

The next day the search was continued by a number of others, who had heard the story, and come to volunteer their services. Search as closely as they could, beyond the footprints in the snow at the point near the path, they could not be followed further. How the child could have vanished and left no farther trace puzzled every one. If she had been seized by a wild animal, its tracks would surely have been left in the snow, but there was nothing of the kind. There was no explanation to be offered, and the mystery of the disappearance was not revealed until several days later.

A Strange Battle

Peter Swadley, a noted bear hunter of Webster, is now in the village being treated for the wounds he received from the huge bird over on Laurel Creek day before yesterday. He is still in a precarious condition from the encounter. Swadley was brought to Addison by Abe Kitsmiller on the afternoon of the day it happened. Swadley was hunting a bear over on Piney Ridge, and had his dog Gunner with him. The two were tracking a bear, whose haunts Swadley had known for some days, through the laurel on the mountain side, when he came into a little clearing and suddenly without other warning than a scream louder than that of a panther, which Swadley thought at first had jumped on him, the immense feathered creature swooped down with the evident intention of bearing him off. The bird dug its talons in his back, tearing his coat into shreds, and for some minutes there was a fierce fight

in the snow. Swadley lost his rifle, and did not get a chance to use his hunting knife. Though he is a large, powerfully built man, he had no chance with his bare hands, and his wounds show what a fight for life it must have been. One of the worst wounds the hunter received was over the left eye, where the scalp was torn away for at least three inches, making a terrible wound. Swadley still managed to retain his footing in the snow, though nearly unconscious, and strove to ward off the blows of the eagle's talons, which nearly tore him in pieces. Swadley's dog Gunner was probably the only thing that saved him from being killed. The dog was off from its master when the bird attacked him, but when Swadley shouted it returned and made for the eagle. The latter turned from the man to the dog, and Stradley says with one stroke of its powerful claws ripped open its stomach and flew away with the poor creature whining in its talons.

Almost blinded by the blood which flowed from the wound over his eye, the hunter contrived to find his way down the mountain side to the cabin of Abe Kitsmiller, on Little Laurel Creek, a mile or more from the place of conflict. He stumbled into the cabin nearly dead from the loss of blood. Kitsmiller was at home, and after he had bound up Swadley's wounds as well as he could, he put him on a horse and brought him to Addison.

Owing to the fact that the bird came on him so suddenly, and nearly blinded him at the outset by the blow on the head, Swadley is not able to give much of a description of it. Its strength, however, he declares, was prodigious, and twice he was lifted off his feet by its onslaughts. Its body, he says, is as large as that of a man. "Ef it was to come as ter how I should have ter pick atwixt a painter and the varmint, in a fair hand-to-hand fight, I should take the painter every time," he said in telling of the affair.

A Deputy Sheriff's Experience

Rube Nihiser, one of the County Deputy Sheriffs, who lives over on Spruce Creek, near the foot of Owl Head Mountain, and his son Hanse had a strange experience with the eagle last Thursday. Rube and his son started out in the morning on a deer hunt. As a light snow had fallen the night before it was a splendid time to track the game. They had not been out but two or three hours when they ran across the trails of a doe and fawn, and followed them around the base of the mountain, across on Piney Ridge, down it to the laurel beds on a little branch of Sugar Run. The two hunters expected to find the deer in the beds, as they had evidently been out feeding the night before, and had gone, they thought, into the beds for the day. Contrary to expectations, the tracks led through the laurel, where they were followed with difficulty into a forest of hemlocks. From the fact that the hemlock branches were so thick, and the day was so dark, it was hard to make out the trail. Nihiser knew the place well, as it was a favorite "crossing" for the deer, along which they were accustomed to go to another laurel bed some distance away.

The two men had nearly got out of the forest and reached a clearing which had been made by fire burning the trees for several acres, when they heard a terrible commotion ahead. There were ear-splitting screams. They hurried to the edge of the cleared spot, and 200 yards away saw the doe and fawn with a tremendous bird of some kind circling above them, and pouncing down first on one and then on the other. The bird was of immense size, and was emitting the screams which were heard. The doe was vainly trying to protect the fawn. Nihiser and his son were so astounded at the sight that they simply stood and watched. The fawn was bleating fearfully, and the doe was trying to ward off the terrible attacks

from the eagle. The latter would circle up, they said, in the air 50 or 60 feet, and then swoop down on the deer. As the two men looked the bird suddenly wheeled down, and, fastening its talons in the fawn's body, flapped its wings and sailed away, apparently with ease, over the tops of the dead trees. Nihiser put up his rifle, and fired a departing shot without effect. They watched the bird, which flopped its wings until it had risen some distance up in the air, then sailed off toward the almost inaccessible fastnesses of Snaggle Tooth Knob.

The doe stood as if dazed when the men approached and did not attempt to move away. It was found that its eyes had been scratched out by the eagle's claws, and it was so badly wounded that it could hardly stand. Nihiser cut its throat with his hunting knife, and its hide was found to be almost torn to ribbons.

Nihiser and his son say that the bird which they saw was of immense size, and that its spread of wings must have been fully 15 or 18 feet. Its body, they say, was as large as that of a man, and its cries were loud and shrill in the extreme. The feathers were of a dark brown color, with white on the wings, and light underneath. Its eyes were tremendous, larger than those of the largest-sized owl, and they shone with terrible brilliancy, plainly discernible from where they stood and watched.

How A Sheep Was Stolen

The presence of the eagle in the county can account for in some way the inexplicable disappearance a few days ago of a sheep belonging to Hanse Hardrick from his little clearing over on Rattlesnake Run, about eleven miles north of Addison. Hardrick has a few sheep which he manages to keep through the winter. As the snow is so deep and the cold so intense this winter in Webster the sheep are kept in

a bark-covered shed a few rods from the cabin. The shed is closed on all sides and the only entrance is through a door, fronting the cabin. One morning recently Hardrick and his wife locked up the cabin and came to Addison, returning in the evening. Hardrick went to feed the sheep, when he found one of them missing. The others seemed to be frightened badly, and were huddled together in a corner of the shed. Wool was scattered all over the place, and there was a hole in the roof as if somebody had broken through. Clinging to the edges of the opening were bits of wool, which showed plainly that the sheep had been taken out that way. What puzzled Hardrick more than anything else was the fact that there were no tracks whatever anywhere about the shed, which the snow would plainly have revealed had the agency that took the sheep been, as he thought, a human one. Though not more superstitious than the rest of the mountaineers, Hardrick made up his mind that his place had been visited in his absence by a "harnt" of more than ordinary animosity. He repaired the hole in the roof, and to prevent the return of the spirit, as is the custom of the West Virginia mountaineers, made small crosses of hemlock boughs, placed them in the shed, and nailed one over the cabin door. From what he has heard since of the eagle, he is convinced that it swooped down on the shed during his absence, tore a hole in the roof and carried away the missing sheep.

The eagle has been seen several times at a distance by mountaineers living in the Snaggle Tooth Knob locality, and its den is evidently in the ice-bound cliffs and crags of that formidable mountain. Eph Cogar, a tenant of the Panther Cove District, which is only a few miles from the top of Snaggle Tooth Knob, for some weeks has told of a bird of gigantic proportions which he has frequently seen circling

across the valley where he lives. As Eph is addicted to telling what are known in Webster as "moon-shine" stories, and is also addicted to a free use of pine-top whisky, his stories have never been credited. He avers, though, that what he has seen "was the onerest thing in the shape of a flyin' critter I ever heerd uv befo'."

A Second Visit

"Pap" Tammen, one of the oldest mountaineers in Webster, says that he remembers many years ago, when the county was invaded by two just such birds as the one which is now in Webster, and that they had their den on Snaggle Tooth Knob, just as this one has. He says that the creatures committed all kinds of depredations on the live stock of the people in the county, and that they remained in their haunts until the winter was over, when they disappeared and were never heard of again. This bird may be one of those which visited Webster then and has returned to its former haunts. Such a powerful creature would likely live many years. Why it has made both visits to Webster in the winter season is a mystery, as is everything else concerned about this modern counterpart of the traditional roc.

Things have come to such a pass that the Websterites are at a loss what to do. Mindful of the fate which befell the little Junkins girl, children are kept closely in the cabins, and the men who find it necessary to go about where there are no protecting trees keep a watchful eye upward, much in the same manner as do chickens watching for a henhawk.

Realistic in the extreme, the mountaineers have made no misnomer in their name of "Snaggle Tooth Knob." The peak, or rather the face, resembles almost exactly the crooked front tooth of a human being, one cliff overlapping another. The Knob even in summer is unapproachable, as in order to reach its

summit it is necessary to scale a mass of perpendicular rocks. At this time of the year, when the cliffs are covered with sheets of ice, and the crevices, wide enough for a man to slip through, are hidden by thin coverings of snow, the undertaking would be rendered tenfold more hazardous.

Through the long, dark nights and the cheerless winter days there is a mother's heart in the Junkins' cabin heavy and aching with a terrible loss. Since the discovery was made that her little girl was most likely taken by the eagle, and carried to its bleak eyrie on the summit of one of the most elevated spots in Webster, Mrs. Junkins has scarcely eaten or slept. She speaks but little, and for the most part of the time sits in the chimney corner staring into the fire with a vacant expression, and looking blankly at any one speaking to her. Occasionally she rises and walks hurriedly to the front window, where, with its summit capped with snow, or enveloped in a hood of cloud, frown grimly down the barren crags of Snaggle Tooth Knob. What sensations she has at such times can best be realized by a mother who could imagine herself in her place.

As fascinating as this story is, it is nothing more than a newspaper hoax. This St. Louis newspaper published articles on strange wonders of nature and technology as pure entertainment. This story of a young girl abducted by a horrifying creature was meant to shock and tug at the hearts of readers with all of its carefully crafted details. It is a simple matter, however, to point out the problem with the story.

You might imagine that rural Addison, West Virginia—now known as Webster Springs—had little contact with newspapers during the late 1800s. Not so. There were newspapers operating in Webster county (the *Addison Call*) and adjacent Braxton, Upshur, and Nicholas counties. Such a tragic story would have merited notice in any of these newspapers. After all, where did the

St. Louis newspaper supposedly get the story? Careful searching through these newspapers at the West Virginia University research library in Morgantown showed that no such event took place. This library houses the largest collection of West Virginia newspapers on microfilm. There were no blocks of missing issues to hinder research through this time period, and there were plenty of adjoining county newspapers which would have acknowledged such a tragedy long before a Missouri publication.

This illustrates the importance of locating original materials. You will find that early newspapers regularly included articles from news sources around the country. This gave local residents a glimpse into other communities, and brought an expanding nation together. Searching for the original sources is necessary, but can be time-consuming and difficult. Early newspapers may have never been adequately preserved and microfilmed before they were lost. Some collections are only housed in small academic libraries or historical societies with access restrictions.

Locating an original news source does not automatically qualify it as true; some are clearly farfetched from the start—but a report which should be noted, and can't be found within an available series of newspapers, is clearly unreliable. In this case, there is an abundance of material from that period and location which can be searched. Investigators should mark this story as a hoax—using it would be a disservice to those who continue to investigate Thunderbirds.

CHAPTER ELEVEN

Giant Orangutans

"Of the existence of a most gigantic animal there can be no doubt; but it must either be an inhabitant of the interior only, or must flee most rapidly from the encroachments of civilization. The first is the most probable; for it is scarcely possible, if ever an inhabitant of the coasts, that a solitary individual only should have been observed, during the very long period that this country has been possessed by Europeans, among whom were men most zealous in the pursuit of natural history, and to whom this had been long held up as one of the greatest acquisitions that could be procured. This will appear the less singular when we consider the immense extent of unknown territory, occupied by forests almost boundless, and of the most impenetrable description, and we may easily conceive that they will possess many tenants, hitherto unseen even to the piercing eyes of the native hunters."

—Sir William Jardine (n.d.)

When mystery primates in Indonesia are mentioned, most think of the dwarfish Orang Pendek of Sumatra which has been the focus of several expeditions. Sanderson (1961) provided several accounts of this diminutive bipedal primate—though he preferred the term *Sedapa*—described from the early 1800s forward. Besides that particular cryptid, Sanderson briefly mentioned another mystery primate reported from Sumatra:

"There is spread all over what is called by zoologists the Malaysian Subregion—*i.e.* that described above as encompassing the foot of the Malay Peninsula, Sumatra, Borneo, and Java—a wealth of folklore concerning not just this Sedapa, but also a man-sized ABSM, and, in Sumatra, a giant type called very simply and logically the *Orang Gadang*, or Great Man."

Sanderson provided no accounts of this Orang Gadang, though he gave space to other mystery primates from the Malaysian region. There has been confusion in early reports which failed to discriminate between hairy primates and the native tribal group known as the Kubu. This has been discussed by Heuvelmans, Sanderson, and, more recently, Short (2001). There are, however, intriguing reports of a separate enigmatic primate from this region—orangutans distinctly larger than known orangutans.

Today, the orangutans, *Pongo*, are represented by two species previously considered subspecies (Wich, et al, 2003). *P. abelii* is the Sumatran orangutan, while *P. pygmaeus* is found in Borneo. Groves (1971) noted that male orangutans have an average standing height of 1366 mm, with a known record height of 1800 mm. Orangutans show high genetic diversity within each species and are genetically variable between disparate populations (Warren, et al., 2001). The morphological variation found in orangutans created a strong interest within the scientific community during the early 1800s. Thomas Huxley's essay, *On the Natural History of the Man-Like Apes*, reviewed the early attempts to differentiate the various species of apes. Huxley (1877) stated, "In Borneo the Orang-Utan of the Malays goes by the name of 'Mias' among the Dyaks, who distinguish several kinds as Mias Pappan or Zimo, Mias Kassu, and Mias Rambli. Whether these are distinct species, however, or whether they are mere races, and how far any of them are identical with the Sumatran Orang, as Mr. Wallace thinks the Mias Pappan to be, are problems which are at present undecided; and the variability of these great apes is so extensive, that the settlement of the question is a matter of great difficulty."

These three orangutan forms (Pappan, Kassu, and Rambli) are consistently noted within the early scientific literature, although

there is confusion concerning their respective characteristics. In order to understand what is involved, it is best to examine the discussions as they occurred.

From Captain Henry Keppel's (1846) account of his trip to Borneo:

"12th.—I received from the rajah a present of an ourang-outang, young, and like others I have seen, but better clothed, with fine long hair of a bright chestnut color. The same melancholy which characterizes her race is apparent in Betsy's face; and though but just caught, she is quite quiet unless teased.

"From the man who brought Betsy I procured a *Lemur tardigradus*, called by the Malays *Cucan*, not *Poucan*, as written in Cuvier—Marsden has the name right in his dictionary—and at the same time the mutilated hand of an ourang-outang of *enormous* size. This hand far exceeds in length, breadth, and power, the hand of any man in the ship; and though smoked and shrunk, the circumference of the fingers is half as big again as an ordinary human finger. The natives of Borneo call the ourang-outang the *Mias*, of which they say there are two distinct sorts; one called the *Mias rombi* (similar to the specimen aboard and the two in the Zoological Gardens), and the *Mias pappan*, a creature far larger, and more difficult to procure. To the latter kind the hand belongs. The *mias pappan* is represented to be as tall or taller than a man, and possessing vast strength: the face is fuller and larger than that of the *mias rombi*, and the hair reddish, but sometimes approaching to black. The *mias rombi* never exceeds four or four and a half feet; his face, unlike the *pappan*, is long, and his hair redder. I must own myself inclined to this opinion from various reasons:—1st. The natives appear so well agreed on the point, and so well acquainted with the distinction and the different names, that it is impossible to suppose it a fabrication

for our peculiar use. Of the many whom I asked respecting them, at different times and in different places, the greater part of their own accord mentioned the difference between the mias pappan and the mias rombi. The animal when brought aboard was stated to be the mias rombi, or small sort. In short, the natives, whether right or wrong, make the distinction. 2d. The immense size of the hand in my possession, the height of the animal killed on the coast of Sumatra, and the skull in the Paris museum, can scarcely be referred to an animal such as we know at home; although by specious analogical reasoning, the great disparity of the skulls has been pronounced the result merely of age.

"However, facts are wanting, and these facts I doubt not I can soon procure, if not actual proof; and whichever way it goes, in favor of Buffon's Pongo or not, I shall be contented, so that I bring truth to light."

Naturalist Sir James Brooke accompanied Keppel on his voyage, and gave further details (written to Mr. Waterhouse from Singapore, 25th March, 1841, and reprinted by Keppel from the *Transactions of the Zoological Society*):

"I am happy to announce the departure of five live ourang-outangs by the ship Martin Luther, Captain Swan; and I trust they will reach you alive. In case they die, I have directed Captain Swan to put them into spirits, that you may still have an opportunity of seeing them. The whole of the five are from Borneo: one large female adult from Sambas; two, with slight cheek-callosities, from Pontiana; a small male, without any sign of callosities, from Pontiana likewise; and the smallest of all, a very young male with callosities, from Sadung. I will shortly forward a fine collection of skulls and skeletons from the northwest coast of Borneo, either

shot by myself or brought by the natives; and I beg you will do me the favor to present the live ourangs and this collection to the Zoological Society. I have made many inquiries and gained some information regarding these animals, and I can, beyond a doubt, prove the existence of two, if not three, distinct species in Borneo.

"First, I will re-state the native account; secondly, give you my own observations; and thirdly, enter into a brief detail of the specimens hereafter to be forwarded.

"1st. The natives of the northwest coast of Borneo are all positive as to the existence of two distinct species, which I formerly gave you by the names of the *Mias pappan* and *Mias rombi*; but I have since received information from a few natives of intelligence that there are three sorts, and what is vulgarly called the *Mias rombi* is in reality the *Mias kassar*, the *rombi* being a distinct and third species. The *Mias pappan* is the *Simia Wurmbii* of Mr. Owen, having callosities on the sides of the face: the natives treat with derision the idea of the *Mias kassar* or *Simia morio*, being the female of the *Mias pappan* or *Simia Wurmbii*; and I consider the fact can be established so clearly that I will not trouble you with their statements: both Malays and Dyaks are positive that the female of the *Mias pappan* has cheek-callosities the same as the male; and if on inquiry it prove to be so, the existence of three distinct species in Borneo will be established. The existence of the *Mias rombi* is vouched by a few natives only, but they were men of intelligence; and well acquainted with the animals in the wild state. They represent the *Mias rombi* to be as tall as the *pappan*, or even taller, but not so stout, with longer hair, a smaller face, and no callosities either on the male or female; and they always insisted that it was not the female of the *pappan*.

"The Mias kassar or *Simia morio* is of the same color as the Mias pappan, but altogether smaller, and devoid of callosities either on the male or female adults.

"By the native statements, therefore, we find three distinct species, viz. the Mias pappan or *Simia Wurmbii*, the Mias kassar or *Simia morio*, and the Mias rombi, which is either the *Simia Abelii*, or a fourth species. The existence of the Sumatran ourang in Borneo is by no means impossible; and I have already compared many of the native statements, that I place more confidence in them than I did formerly, more especially as their account is in a great measure borne out by the skulls in my possession. I had an opportunity of seeing the Mias pappan and the Mias kassar in their native woods, and killing one of the former and several of the latter species. The distribution of these animals is worthy of notice, as they are found both at Pontiana and Sambas in considerable numbers, and at Sadung on the northwest coast, but are unknown in the intermediate country which includes the rivers of Sarawak and Samarahan. I confess myself at a loss to account for their absence on the Sarawak and Samarahan rivers, which abound with fruit, and have forests similar and contiguous to the Sadung, Linga, and other rivers. The distance from Samarahan to Sadung does not exceed twenty-five miles; and though pretty abundant on the latter, they are unknown on the former river. From Sadung, proceeding to the northward and eastward, they are found for about 100 miles, but beyond that distance do not inhabit the forests. The Mias pappan and Mias kassar inhabit the same woods, but I never met them on the same day; both species, according to the natives, are equally common, but from my own experience the Mias kassar is the most plentiful. The Mias rombi is represented as unfrequent and rarely to be met with. The pappan

is justly named *Satyrus*, from the ugly face and disgusting callosities. The adult male I killed was seated lazily on a tree, and when approached only took the trouble to interpose the trunk between us, peeping at me, and dodging as I dodged. I hit him on the wrist, and he was afterward dispatched. I send you his proportions, enormous relative to his height; and until I came to actual measurement my impression was that he was nearly six feet in stature."

Brooke's measurements showed this orangutan to be 4 foot, 1 inch, from head to heel, and another 9 3/4 inches from forehead to chin. He continued:

"The natives asserted the animal to be a small one; but I am skeptical of their ever attaining the growth of a tall man, though I bear in mind that full-grown animals will probably differ as much in length as man.

"Some days after this, and about thirty miles distant, I was fortunate enough to kill two adult females (one with her young), and a male nearly adult, all the *Mias kassar*. The young male was not measured, owing to my having waded up to my neck in pursuit of him, and thereby destroyed my paper and lost my measure; but he certainly did not exceed 3 feet, while the two females were about 3 ft. 1 in. and 3 ft. 2 in. in height. The male was just cutting his two posterior molars: the color of all resembled that of the *Mias pappan*, but the difference between the two animals was apparent even to our seamen. The *kassar* has no callosities either on the male or female, whereas the young *pappans* dispatched by the Martin Luther (one of them not a year old, with two first molars) show them prominently. The great difference between the *kassar* and the *pappan* in size would prove at once the distinction of the two species; the *kassar* being a small, slight animal, by

no means formidable in his appearance, with hands and feet proportioned to the body, and they do not approach the gigantic extremities of the pappan either in size at power; and in short, a moderately strong man would readily overpower one, when he would not stand the shadow of a chance with the pappan. Beside these decisive differences may be mentioned the appearance of the face, which in the Mias kassar is more prominent in the lower part, and the eyes exteriorly larger, in proportion to the size of the animal, than in the pappan. The color of the skin in the adult pappan is black, while the kassar, in his face and hands, has the dirty color common to the young of both species. If further evidence was wanted, the skulls will fully prove the distinction of species; for the skulls of two adult animals compared will show a difference *in size alone* which must preclude all supposition of their being one species. Mr. Owen's remarks are, however, so conclusive, that I need not dwell on this point; and with a suite of skulls, male and female, from the adult to the infant of the Mias kassar, which I shall have the pleasure to forward, there can remain, I should think, little further room for discussion. I may mention, however, that two young animals I had in my possession alive, one a kassar, the other a pappan, fully bore out these remarks by their proportionate size. The pappan, with two molars, showed the callosities distinctly, and was as tall and far stouter than the kassar with three molars, while the kassar had no vestige of the callosities. Their mode of progression likewise was different, as the kassar doubled his fists and dragged his hind quarters after him, while the pappan supported himself on the open hands sideways placed on the ground, and moved one leg before the other in the erect sitting attitude; but this was only observed in the two young ones, and cannot be considered as certainly applicable to all."

Brooke also noted differences in skulls:

"The length of my letter precludes my dwelling on many particulars which, as I have not seen the recent publications on the subject, might be mere repetitions; and I will only mention, as briefly as I can, the skulls of these animals in my possession. From my late sad experience I am induced to this, that some brief record may be preserved from shipwreck. These skulls may be divided into three distinct sorts. The first presents two ridges, one rising from each frontal bone, which, joining on the top of the head, form an elevated crest, which tuns backward to the cerebral portion of the skull.

"The second variety is the *Simia morio*; and nothing need be added to Mr. Owen's account, save that it presents no ridge whatever beyond the frontal part of the head. No. 9 in the collection is the skull of an adult male: No. 2 the male, nearly adult, killed by myself: Nos. 11 and 3 adult females, killed by myself: No. 12 a young male, with three molars, killed by myself: No. 21 a young male, died aboard, with three molars: No. 19, young male, died aboard, with two molars. There are many other skulls of the *Simia morio* which exactly coincide with this suite, and this suite so remarkably coincides through the different stages of age, one with another, that no doubt can exist of the *Simia morio* being a distinct species. The different character of the skull, its small size and small teeth, put the matter beyond doubt, and completely establish Mr. Owen's acute and triumphant argument, drawn from a single specimen.

"The third distinction of the skulls is, that the ridges rising from the frontal bones do not meet, but converge toward the top of the head, and again diverge toward the posterior portion of the skull. These ridges are less elevated than in the first-mentioned skulls, but the size of the adult skulls is

equal, and both present specimens of aged animals. For a long time I was inclined to think the skulls with the double ridge were the females of the animals with the single and more prominent ridge; but No. 1 (already described as killed by myself) will show that the double ridge belongs to an adult and not young male animal, and that it belongs to the *Simia Wurmbii* with the huge callosities. The distinction therefore cannot be a distinction of sex, unless we suppose the skulls with the greater development of the single ridge to belong to the female, which is improbable in the highest degree. The skulls with the double and less elevated ridges belong, as proved by No. 1, to the *Simia Wurmbii*; and I am of opinion the single and higher ridge must be referred to another and distinct species, unless we can account for this difference on the score of age. This, I conceive, will be found impossible, as Nos. 7 and 20 are specimens similar to No. 1, with the double and less elevated ridges decidedly old, and Nos. 4 and 5 are specimens of the single high ridge, likewise decidedly old.

"These three characters in the skulls coincide with the native statements of there being three distinct species in Borneo, and this third Borneon species may probably be found to be the *Simia Abelii*, or Sumatran ourang. This probability is strengthened by the adult female on her way home: her color is dark brown, with black face and hands; and in color of hair, contour, and expression, she differs from the male ourangs with the callosities to a degree that makes me doubt her being the female of the same species. I offer you these remarks for fear of accident; but should the specimens, living and dead, arrive in safety, they will give a fresh impetus to the inquiry, and on my next return to Borneo I shall, in all probability, be able to set the question at rest, whether there be two or three species in that country."

Famed naturalist Alfred Russel Wallace would, not long after, make his own observations on orangutans and the theorized forms. Wallace's (1856) differentiations were:

"The males procured by me may be divided into two groups, differing considerably both in the external characters and in those of the cranium. The first and most abundant is the large animal known among the natives as the 'Mias pappan' or 'Mias chappan,' the latter name being used by the Dyaks as well as that of 'Mias Zimb,' while the former is, on the authority of Sir James Brooke, a name applied to it by the Malays. It is known by its large size and by the lateral expansion of the face into fatty protuberances or ridges over the temporal muscles, which have been mistermmed callosities, as they are perfectly soft, smooth and flexible. Five of this form measured by me varied only from 4 feet 1 inch to 4 feet 2 inches in height from the heel to the crown of the head, the girth of the body from 3 feet to 3 feet 7 1/2 inches, and the extent of the outstretched arms from 7 feet 2 inches to 7 feet 8 inches; the width of the face from 10 to 13 1/2 inches. The colour and length of the hair varied in different individuals and in different parts of the same individual; some possessed a rudimentary nail on the great toe, others none at all, but they otherwise present no external differences on which to establish even varieties of a species. Yet when we examine the crania of these individuals we find remarkable differences of form, proportion and dimension, no two being exactly alike. The slope of the profile and the projection of the muzzle, together with the size of the cranium, offer differences as decided as those existing between the most strongly marked forms of the Caucasian and African crania in the human species. The orbits vary in width and height, the cranial ridge is either single or double, either much or little developed, and

the zygomatic aperture varies considerably in size. This variation in the proportions of the crania enables us satisfactorily to explain the marked difference presented by the single crested and double-crested skulls, which have been thought to prove the existence of two large species of Orang. The external surface of the skull varies considerably in size, as do also the zygomatic aperture and the temporal muscle; but they bear no necessary relation to each other, a small muscle often existing with a large cranial surface and vice versa. Now those skulls which have the largest and strongest jaws and the widest zygomatic aperture, have the muscles so large that they meet on the crown of the skull and deposit the bony ridge which separates them, and which is highest in that which has the smallest cranial surface. In those which combine a large surface with comparatively weak jaws and small zygomatic aperture, the muscles on each side do not extend to the crown, a space of from 1 to 2 inches remaining between them, and along their margins small ridges are formed. Intermediate forms are found in which the ridges meet only in the hinder portion of the skull. The form and size of the ridges are therefore independent of age, being sometimes more strongly developed in the less-aged animal. Professor Temminck states that the series of skulls in the Leyden Museum shows the same result.

"Sir James Brooke first noticed these differences in the ridges, and finding that the Dyaks affirmed that two large species of Orang existed, very naturally concluded that they respectively belonged to them. Mr. Blyth of Calcutta has adopted this view, considering that the animal possessing the double-crested skull has the large cheek-excrecences, while that with the single-crested skull is deprived of them; but my specimens, as well as the series at Leyden, show that these various forms of skull belong

to one and the same species of animal, in which view Sir James Brooke, after an examination of my specimens, perfectly coincides. I may here mention, that Mr. Blyth has since written to Sir J. Brooke acknowledging the receipt of some skeletons from Sarawak, and stating that he has found a new species among them distinguished by its shorter and more robust limbs and slightly projecting jaws. The great amount of variation, however, which exists in these respects among animals whose external characters are identical, would show that it is not possible to establish a new species on such grounds from a single specimen. As an instance of the extreme variation which occurs in the skull of the fully adult male Orang with cheek-excrecences, I may mention that the width between the orbits externally is only 4 inches in one specimen and fully 5 in another, while the two animals did not differ 1 inch in their total height.

"The second form of male Orang which I have procured differs so remarkably from the first, that it seems well entitled to be considered a distinct species. The two fully adult specimens which I obtained were respectively 3 ft. 8 1/2 in. and 3 ft. 9 1/2 in. in height, 6 ft. 6 in. in extent of arms, and about 2 ft. 6 in. in girth of body. They possessed no signs of the cheek-excrecences, but in other respects resembled the larger kinds. The skull is smaller and weaker, and the zygomatic arches narrower than in the large species; it has no bony crest, but two faint ridges from 1 3/4 inch to 2 inches apart, exactly as in the *Simia Morio* of Prof. Owen, figured in the 'Transactions of the Zoological Society.' The teeth however are in proportion to the skull, of immense size, equalling, and in one case surpassing, those of the larger animals: the molars extending further backward, and the incisors and canines being set closely together, room is found for them in a much smaller jaw. The great canine teeth are quite as large as in most

specimens of the larger animal, and of exactly the same form. These animals the Dyaks called 'Mias Kassu.'"

Wallace also recorded a third ethnoknown orangutan:

"The Dyaks of N.-Western Borneo, however, have names for three species of Mias, although I could never find any one who could determine them with precision. All the animals with large cheek-excrecences form the 'Mias chappan,' but they declare that females are also found of the same form. Authenticated female specimens, however, with cheek-excrecences do not exist in Europe, and if they ever do occur, seem far too rare in proportion to the males to be any other than an accidental variety in which the one sex has assumed characters generally confined to the other. All Orangs of smaller size and without cheek-excrecences are called by the Dyaks Mias Kassu, and my small males and females are undoubtedly of this kind; but these people have asserted that every female I shot was a Mias Kassu, so that I am rather inclined to think that they have regarded the larger males as distinct species from the smaller and differently formed females. In one case however they said that a female was a Mias chappan, though it possessed no cheek-excrecences, nor differed from the other females except in having the skin of the throat rather more loose and inflated than usual,—a character generally very prominent in the large males. The third kind they call the Mias rambi, and they say it equals the 'chappan' in size, but has no cheek-excrecences and very long hair. This seems very rare, and is probably one of the large species in which the excrecences have been little or not at all developed. One of my females they asserted with hesitation to be a 'rambi,' but I could not perceive that it in any way differed from the others except in a much paler colour than usual."

Wallace concluded that there were two authenticated species of orang-utans (Kassu and Chappan) in Borneo, one of which was the same as the Sumatran orangutan. Obviously, the ethnoknown orangutans were confusing to both the scientists and the native peoples. Differentiation was based on characters which we now know are part of the natural morphological diversity within the two species.

Keppel suggested that Mias Rombi [=Rambi] was a moderately sized form, and that Mias Pappan [=Chappan, =Zimb] was as tall as a man or taller. Brooke thought the Mias Pappan to be the moderate form, the Mias Rombi larger than the Mias Pappan, and the Mias Kassar [=Kassu] to be the smallest form. Wallace suggested that the Mias Kassar was the smallest form, the Mias Pappan was the moderately large form, and that the Mias Rombi was probably just a Mias Pappan without the "cheek-excrecences."

If we were considering only the cheek flanges, coloration, and other morphologically variable characteristics, we could easily file this as an interesting, but moot, early discussion of primate nomenclature. But what about the orangutans which were significantly larger than anything we know today?

Keppel, as noted, offered three evidences in support of a giant orangutan. The first was a large preserved hand, the second was an account of a giant orangutan killed in Sumatra, and the third was a skull in the Paris museum. Keppel's account of the hand has been given. The Sumatran account was published in "Asiatic Researches" by Dr. Clarke Abel. The event occurred sometime prior to 1826. Broderip (1849) reviewed this discovery:

"Dr. Owen, in his highly interesting memoir on the osteology of this species and the Chimpanzee, gives the height of the Orang Utan as under five feet; but, according to Dr. Abel, its stature when adult is, sometimes at least, much beyond that limit.

"In the 'Asiatic Researches,' the Doctor lays before us an account of a scene in which one of these unfortunate Orangs was a principal actor, or rather sufferer; an account which no one can read without pain:—

"A party from a brig had, it appears, landed at Ramboon, on the north-west coast of Sumatra, to procure water. The place was much cultivated, and there were but few trees; on one of these trees they discovered a gigantic animal. They approached, and he came to the ground. They pursued, and he made for another tree at some distance, presenting to his pursuers a tall man-like figure covered with a fell of shining brown hair, moving almost erect with a waddling gait, sometimes assisting his progress with his hands, and sometimes by the impulse of a bough which he held. On gaining a small clump, he sprang at a bound to a lofty branch, and passed from one limb of the tree to another with the greatest ease and alacrity. They felt that, if the country had been well wooded, he must, in all probability, have escaped; for he travelled from tree to tree with the swiftness of a horse on the ground. Confined as he was to only a few trees, his movements were so quick that it was very difficult to take aim, and it was not till his hunters had cut down one tree after another, that they were able effectually to begin their butcher-work. Five balls pierced the wretched creature before his exertions relaxed; then, reclining apparently exhausted, on one of the branches, he copiously vomited blood. Still he held on; and their ammunition being all expended, they proceeded to cut down the tree, convinced that he was so far gone that they could then secure him without trouble. The tree nodded to its fall; but, as it was falling, they, to their surprise, saw him gain another, and they were obliged to cut down all the trees before they could bring him to earth. Even then, mangled as he was, he made a most determined defence against the numbers who attacked him with spears, large stones, and other missiles. He broke the shaft of one spear—it was made of a supple wood, and would have withstood the strength of the stoutest

man—'as if it had been a carrot,' to use the words of the narrator. Those who aided in this slaughter acknowledged that they were distressed by the human-like expression of his countenance, the piteous manner in which he applied his hands to his wounds, and the whole bearing of the dying combatant. They confessed that the sight was such as almost to make them question the nature of the act they were committing. He lay dead before them, upwards of six feet in length at the lowest computation, according to the narrative.

"We know not what view their worships of the learned societies may take of this transaction, for there is no telling how far a zeal for science may carry its votaries, but to the unlearned it must look rather murderous.

"The captain, who furnished Dr. Abel with the details, stated that the creature was a full head taller than any man on board, measuring seven feet in what might be called his ordinary standing posture, and eight feet when suspended for the purpose of being skinned. Dr. Abel describes the skin, dried and shrivelled as it was, as measuring in a straight line, from the top of the shoulder to the part where the ancle had been removed, five feet ten inches; the perpendicular length of the neck, as in the preparation, three inches and a half; the length of the head, from the top of the forehead to the end of the chin, nine inches; and the length of the skin still attached to the foot, from the line of its separation from the leg, eight inches. 'We thus,' says Dr. Abel, 'obtain seven feet six inches and a half as the approximate height of the animal.' These dimensions are startling, and far exceed those warranted by the skeletons of adult Orangs hitherto brought in this country.

"The hair of the head was of a reddish brown, growing from behind forwards, and five inches in length. The chestnut-coloured beard was handsome,

but very wiry, and appeared to have been curly in life, springing gracefully from the upper lip, near the angles of the mouth, in the form of moustaches, and thence descending to mingle with the portion growing on the chin."

Jardine (n.d.) also quoted from Abel's account, including a notation that the natives themselves were surprised by this animal: "It seems probable that the animal had travelled from some distance to the place where he was found, as his legs were covered with mud up to the knees, and he was considered as great a prodigy by the natives as by the Europeans. They had never before met with an animal like him, although they lived within two days' journey of one of the vast and almost impenetrable forests of Sumatra. They seemed to think that his appearance accounted for many strange noises, resembling screams and shouts, and various sounds, which they could neither attribute to the roar of the tiger, nor to the voice of any other beast with which they were familiar."

Among other details, Abel described the hands and feet: "The length from the end of the middle finger to the wrist, in a right line, was one foot; the circumference over the knuckles, eleven inches; the length of the thumb above the palm, two inches and a half. The feet are covered with long brown hair on the back, to the last joint of the toes, and the great toe is set on nearly at right angles. The length of the foot, from the heel to the end of the middle toes, one foot two inches; the circumference round the knuckles, nine inches and three quarters; length of the great toe, upon lower surface, two inches and three quarters."

This Sumatran ape's remains were deposited in the museum of the Asiatic Society of Bengal. That organization's zoology collection was later accessioned by the Indian Society, Kolkata. I have not been able to determine whether this specimen is still in the museum's collection. It appears possible (Röhrer-Ertl 1988) that the specimen may have been shipped to Britain and used by Richard Owen in his anatomical research on orangutans prior to 1830.

The skull that Keppel mentions is a mystery. I can find no further details of a large orangutan skull placed in the Paris mu-

seum beyond a brief mention by Jardine. I assume that it must have been distinctive enough to merit publication, but have not yet found specific details. Keppel does not note whether his giant orangutan hand was placed in a museum. I urge British and French investigators with contacts at the British Museum, the Royal Asiatic Society, the Muséum National d'Histoire Naturelle, and any other pertinent collections, to determine if these specimens were ever accessioned.

Most orangutan research today focuses on conservation efforts and behavioral studies. Most books and articles really don't detail the wide morphological variability. Rijksen and Meijaard (1999) documented both gracile and robust forms among these apes, suggesting that the peculiar walk of gracile orangutans may be responsible for some purported Orang Pendek prints.

One interesting quote from Kaplan and Rogers (2000) suggested that big orangutans might still wander the islands—"From the eighteenth century on, there have been occasional reports of very large modern-day orangutans walking upright on the ground. The well-known orangutan researcher John MacKinnon was shocked when he almost bumped into a huge orangutan walking along a path. Likewise, Biruté Galdikas, who has spent most of her life studying orangutans, spoke of her encounter with an extremely large walking orangutan. He was ambling along a path, looking down, at first unaware of her presence. On catching sight of Biruté, some four meters away, he stared at her and then suddenly whirled around and was gone."

What can we speculate about giant orangutans? If such animals existed, it might explain the early ethnozoological confusion surrounding the various names given for orangutan forms. If a giant orangutan was thought to exist, but was rarely encountered, it might provide justification in the minds of some natives to distinguish the forms using characters they had heard about but with which they were not specifically familiar. This could lead to faulty distinctions being made between forms with callosities and those without, or between individuals within a normal range of differing sizes.

Would a giant orangutan necessarily be a new species or subspecies? If hair or blood can be obtained for genetic analysis, it would be simple to determine whether it is just a large specimen of one of the extant orangutan species. There was a Pleistocene fossil orangutan from Sumatra, *P. p. palaeosumatrensis*, which is believed to have been larger than the extant Sumatran species (Schwartz, et al., 1995). [Actually, I have not seen a discussion of this fossil subspecies since *P. abelii* was resurrected as the Sumatran orangutan, so I suppose it might now be referable to *P. abelli*.] The size, up to 2 meters or more in height (Kaplan and Rogers 2000), is inferred from the proportionally larger fossil teeth which have been found. There were also fossil orangutans from mainland Asia significantly larger than extant orangutans.

The focus of any further research on this subject should be to determine whether any of the mentioned specimens still exist, and whether the Sumatran or Bornean tribal groups still have any knowledge of the Orang Gadang or a giant Mias. Interesting historical accounts may still be found, but most will be in German, Dutch, or other non-English languages. Orangutan field researchers could provide anecdotal accounts, allowing specific regions to be targeted for fieldwork. It may, of course, be too late for any giant orangutans, with habitat destruction rampant in Indonesia, but the results could spur interest in other mystery primate investigations in south-east Asia.

For those who want to investigate something else altogether, I quote Rijksen and Meijaard (1999): "In 1905, another German explorer, Gustav Schneider, again reported sightings of the ape in the hinterland of Sibolga (i.e. Anggolia) and at the mouth of the river '*Badiri*' (i.e. probably the river Batang Toru). Interestingly, these early reports suggest that these southern orang-utans are very dark ('black') in appearance." Are black orangutans a known phenotype?

CHAPTER TWELVE

Notes on the Search for Historical Primate Reports

One particularly interesting area of Bigfoot research is the search for the "Historical Bigfoot," or those early reports which describe creatures resembling the Bigfoot sightings we gather today. In general, there are not nearly as many historical sightings compared to the number of reports seen today, but there are several factors which could account for this: the active investigation of current researchers, human expansion into previously uninhabited regions, and a better, though not perfect, cultural awareness of native species. Misidentifications and jests make up a number of the early newspaper reports, but there are often serious sightings as well.

Why are historical reports of importance in an investigation? Historical continuity, even if the earlier reports are integrated into common folklore, establishes a cryptid as a native ethnozoological entity. Lack of historical continuity could suggest that its origin is not native—for example, a lack of significant black panther sightings in North America prior to the 1930s may indicate that, whatever is responsible for the sightings, it began at that time. Determining whether the phenomenon is native or introduced suggests a way to approach the field investigation.

Some cryptids, as ethnozoological units, are hidden under socio-religious beliefs. They may be considered spirit-guardians and sightings may be immediately interwoven into the local belief system. For example, Prince (1899) noted the Maine Passamaquoddy belief in the *Kiwa'kw*—"The *kiwa'kw* is essentially a cold demon, rejoicing in snow and ice. An old Indian told me that his father had seen one running on the snow-crust without snow shoes as swiftly as a deer." In other words, if an unrecognized

creature was seen within specific parameters [e.g., during the winter], it would probably have been identified as this specific spirit-being. Similarly, Francello (1980) noted in a brief overview of Seneca folk creatures—"There are huge figures such as the husk faces; one was seen near the old longhouse at Carrolltown who appeared to be eight feet tall, according to a Seneca informant." The *husk faces* are spirit beings who live on "the other side of the world, where the seasons are reversed" (Fenton 1987). Fenton noted that the Iroquois create masks representing these beings out of braided corn husks—both masks and beings given the name *gajihsa?*, or "bushy," "fuzzy."

Emmons (1915) detailed the Northwest coastal Tsimshian's folkloric spirit, Pighish:

"The Monkey Woman, Pighish

"Besides having a knowledge of the animals common to the country, the Kitksan held a general belief in mythical beings half human and animal that lived in the depth of the forest, the inaccessible mountain tops and the waters. Such beings had been seen in early days by certain individuals, and in most instances the meetings had been productive of great good fortune. Representations of these beings had been assumed as crests and their supposed likenesses were displayed on heraldic columns, as well as upon ceremonial dress and paraphernalia.

"Pighish, who was seen first by one of the Kish-hasht clan, was an animal closely associated with the land otter, although very human in appearance, and spoken of to-day as a monkey woman. The presence of Pighish was indicated by the cry of a child, for she always carried on her back a small being much like herself.

"Only one without fault could see this miraculous creature, and when the voice called, he was obliged to follow as the sun goes around four times; then he would come to Pighish. He then must take the child, which immediately appeared to be human.

The mother then pleaded for her infant and it was returned to her, whereupon she agreed to grant any wish asked. In returning the child, the face of the person had to be turned away as he stepped back, lest Pighish kill him with her long claws.

"This spirit is identical with the property women of the Haida and the Tlingit of the Coast."

This is a good example of the blending of folkloric elements. While there are distinct ape-like representations in Pacific Northwest cultures, there are also otter-based folkloric beings, and it can be difficult to distinguish between them. Of course, until such time as someone produces a body, there is no way to effectively demonstrate that a North American primate was responsible for or contributed to any of the wide variety of primate-like Native American mythological creatures.

Socio-religious creature beliefs of North America are by no means constrained to Native American cultures. They can be found in any number of people groups today. In a review of the Ramapo Mountain people of New Jersey, Cohen (1974) interviewed a family who discussed the "screech woman" in Ringwood—"Right across in back of this mountain, down, there used to be what they called 'a screech woman.' A screech woman. And when she screeched, it would raise the hat on your head. But now, Richard says that twelve o'clock at night, now, this thing comes up—up the river—this screech it comes up the river. So she must of changed her course and traveled up that way now. Every night." Of course, this "screech woman" should not be directly identified with Bigfoot, as nocturnal screeches may come from birds or small mammals, but it does represent a phenomenon-based (screeching) folkloric entity to this particular group.

As you become familiar with the historical reports, you will run across quite a few that are based not on a biological species, but on a social phenomenon—the homeless. While today's homeless may cluster around the cities, those unfortunate men and women who fended for themselves back in the late nineteenth and early twentieth centuries would often find themselves in rural regions. We find many reports of such "wild men," and it is quite clear

that the ability to distinguish between man and "ape" was not necessarily a foregone conclusion at that time. One such encounter reported in the Titusville, PA, *Morning Herald* of November 21, 1879, starts out:

"Much of the upper part of Wayne county is still an unbroken wilderness and a resort for hunters from all parts of the country. Charles Ames and Frank Allabean, of Rochester, N.Y., have been camping near Upper Woods Pond during the past week. On Monday they were driving a ridge for deer. Their dogs worked off the ridge to the edge of a dense laurel swamp. Ames was standing at the foot of the ridge on a "run way" pointed out to him by his guide. The yelping of the hounds and a commotion in the swamp put Ames on his mettle, as he supposed a deer was about to leap out into the open space and give him a chance for a shot. His gun was raised ready to fire, when to his surprise he saw a human being spring from the bushes and run rapidly across the opening towards the mountain. He ran in a stooping position, and helped himself along by a dexterous parting of the thick scrub oaks with his hands. His head was bare and his hair long. The opening across which he ran was several rods wide where the thick timber began. The strange being ran so fast that the hunter had very little time to note his appearance, but saw that he was very scantily clad."

The two hunters chased after the wild man, but lost him after a struggle. An investigation determined that the man was a French soldier who had "lost his mind over the defeat of the French army by Germany and the destruction of the empire." Two years prior, he had escaped custody and run into the swamps, creating a small furor in the local newspaper, but forgotten as time went by. Stories like this illustrate the need for caution when trying to determine whether a "wild man" might be based on an unknown primate.

Too often, an excited investigator will overemphasize such reports, when there really isn't enough information to reject the possibility of a homeless individual.

Still, some reports do show distinct possibilities for early recognition of primate-like animals in North America. Frederick Gerstäcker was an early traveler/author who explored the frontier towns in the New World, sending stories back to a fascinated audience in Europe. Born in Hamburg, Germany, in 1816, he eagerly embarked for the United States in 1837 and spent six years living on the road and experiencing everything he could find. He sampled various trades and spent time with people of different cultures. After returning to Germany, he began writing and publishing books on his travels. A second trip was made in 1849, beginning in South America, traveling from there to California, Hawaii, and Australia.

The particular tale of interest to us is from the translated book, *Western Lands and Western Waters*. In it, Gerstäcker described the arrival of a small traveling menagerie to an Arkansas town. The townsfolk were first intrigued by the idea of seeing strange animals, but became upset when they realized that the menagerie's owner, Monsieur Bertrand, expected to be paid an admission fee for the privilege.

Seeing that the townspeople were unwilling to pay to view something without knowing exactly what they were going to see, M. Bertrand allowed two men to examine the animals and report what they saw to the other villagers. The men were shown into the tent, which contained several primates, a cougar, a leopard, and a llama. Marveling at the animals, the two men promptly reported that the exhibit was indeed worth a "quarter-dollar," and M. Bertrand did a steady business. The point of interest for us lies with the response to the primates by the townspeople.

One of the primates was described by Gerstäcker as a chimpanzee, though M. Bertrand stated that it was "a monkéh—an ape... comes from India, lives in a very hot country, very warm, and has much resemblance with men." Seeing this creature excited one of the hunters.

"By this and by that, if it isn't a wild man!" Wilson interposed. 'He was caught down there in the Cash swamps. Prince was after him twice, but couldn't come up with him.'"

Several times, hunters argued about where the Frenchman must have captured the animal.

"Stewart and Wilson had a bet of a deer-skin as to the place where the Frenchman caught the 'wild boy;' Stewart asserting that he had been brought from Leckie's Elbow—a curve in the Mississippi, far down in Tennessee, where one was said to be living in the swamp—while Wilson insisted he was nailed, in some way or other, in the Cash Swamps; and he should himself have captured him on one occasion, had not his foot slipped and plumped him headforemost into one of the numerous bayous there."

After seeing the animal, one man was especially stunned.

"If I only knew where he caught that little specimen of a man!' the old squatter said, to whom this was the most remarkable thing in the whole business. 'Confound his traps; they have no fall or cover, yet they shut quite tight.'

"Well, didn't you ask him, Smithly?" one of the bystanders said.

"Asked? Yes, but it was no use. Bless my soul, what stuff that fellow talks—you can make nothing of it. And the wild men he calls monkehs—what he means by it I don't know; for we call them simple forest men, or wild men—chattered and shrieked, and the spotted panther howled, and an old vagabond of a catamount he has there—devil take the beast, why don't he kill it?—whined and yelled enough to drive one mad.'

“‘And has he really wild men?’ one man, rushing forward, turned back to ask.

“‘Wild men?’ the squatter repeated, gazing on him in surprise; ‘You ask if he has wild men—why, he has a whole nest of them! We only saw one and a heap of young ones, and they look—the Lord knows what strangers we have not got in our forests!’”

Another man, half-drunken, claimed:

“‘Gentlemen, that is a real wild man; for I met one once at White River exactly like this. You have no idea what strength such a harmless-looking creature possesses.’”

There was one thing that surprised the townspeople, however.

“The thing that puzzled them most was the monkey’s tails; for they insisted, in spite of the Frenchman’s protestations, on their being wild men. The stranger was so stupid that he did not know what he had caught; and they, the backwoodsmen of Arkansas, must surely be allowed to know what a wild man of the woods looked like.”

So, we are given the distinct impression that these Arkansas backwoodsmen were familiar with a primate-like ethnoknown they called a “wild man.” Gerstäcker provided his own explanation:

“It is certainly, a peculiar circumstance, that the rumour of ‘wild men’—that is, of men who have turned wild, who then rush into the forests, and cannot be removed from them—should exist in the Western Forests, in spite of the fact that seldom, or never, such a thing comes to light. Frequently, after being quiet for months, the rumour breaks out afresh, and one hunter or the other declares he has found the trail of a wild man, and traced him to his

home in some cave or hollow tree on the mountains. The most terrible stories are told of former captives—how they defended themselves, used their teeth; and how Bill's father, or Jem's grandfather, in the settlement, nearly lost his life in struggling with the apparently weak mannikin, whom they were always compelled, in the end, to shoot, and could never catch alive.

"And this little thin fellow of a Frenchman had caught a whole nest full—who would have expected that of the little withered stranger?

"Well, as I said, they could not agree about the tail, and Stewart at last asserted (and confirmed it not only with a curse, but by an offer to bet three bottles of whisky), that the wild men were descended from the Hasscolds (neighboring squatters), for they had all such precious long backs, that they might easily grow into a tail. This explanation seemed far too probable for any of the other men to venture the wager.

"A report may appear as incredible and absurd as you will, but there is always some foundation of truth for it; and there have, in reality, been wild men, not only in Arkansas, but in many other countries. It is a remarkable fact that men, if lost for any length of time in the forest, are entirely deprived of their reason by fear and excitement; and finally, when found by others, instead of rejoicing at their salvation, leap into the nearest thicket, and try to escape man as their most dangerous foe. As proof of this I will here tell a story of an old backwoodsman, who spent all his life in the forest.

"I have forgotten his name, which, however, is not necessary for the story, but he lived in the western part of Tennessee, not far from the spot where the town of Randolph is now built, and had a small farm at the foot of the hills which run down into the Mississippi Valley. He lost his way, one cloudy

day, while hunting in the enormous swamps of that district, and, instead of lying down and going to sleep quietly, as is the hunter's rule, in order to choose the direction in cool blood and perfect collectedness, he allowed himself to give way to his first impulses of fear, and began to run backwards and forwards. Hence, growing more and more excited, he at length lost consciousness. He ran day and night over the morass, and at last he formed the mad, but fixed idea, that he had somehow crossed the Mississippi, which was at least a mile wide, and must return to the other bank in order to reach his home. He had been missed, however, and his friends set out to look for him. They found him at last, though almost driven to desperation by his zig-zag trail, on the bank of the Mississippi, busily engaged in making a raft, on which to cross the pathless wilderness of the opposite Arkansas swamps. At first, they did not know what he was about; but when he heard them coming, he leaped into the reeds, and they were obliged to drag him home by force. On reaching his log hut he did not recognize it, and looked wildly around, as if meditating a fresh flight; but by degrees his senses returned to him, and the recollection of all that occurred to him.

"Such men, who now and then grow quite savage, are pursued by the hunters, and even killed in self-defence; and, though it may happen so rarely, it seemed as if the truth of that story were confirmed by the presence of such creatures, just as they were thought to be in these extraordinary beasts."

Investigators familiar with primate reports from North America will recognize the possible connection to theorized North American apes. Coleman (1983) noted that reports of a "free-ranging, swimming nocturnal ape" were known dating back to at least 1869. Coleman observed that "the American apes appear to be chimpanzees. Ape-like, hairy and tailless, they range in height

from four to six feet, though now and then some very scared person reports a seven footer." The remark that an encountered "wild man" was stronger than one would imagine corresponds well with known primates. Chimps and orangutans are strong for their size, and a similar strength would not be unexpected in any new species of ape.

Gerstäcker's story supports the idea that an unrecognized species of primate was thought to exist in Colonial North America. It is not confirmative proof, but the story suggests that a moderate-sized tailless primate was believed to exist in certain swamps and bottomlands in Arkansas and along the Mississippi river. Is Gerstäcker's theory a better alternative? I suspect not, but I would like to see further investigation into historical "wild man" reports from this region. If the swamps around Cash (Craighead County), Arkansas, were a known haunt of "wild men," there may be related tales in the historical societies of that region. I have not determined where Leckie's Elbow was on the Mississippi along the Tennessee border, but I suspect that an investigator has a good chance of finding interesting material along that waterway. Former or still existing swampland along the White River in Arkansas would also be a good place to start looking for historical reports.

CHAPTER THIRTEEN

The Pennsylvania “Gorilla”

The following story by Henry W. Shoemaker (1922b) introduces one of the most significant early Bigfoot flaps from eastern North America. As the concept of Bigfoot was not yet known, the reported animal was referred to as a gorilla, monkey, big ape, or missing link. I prefer to start off with this tale, because it allows us to see how folklore changes perception of events. In this story, we see the unfolding of a hoax as a man creates a giant ape suit in order to kill a romantic rival. Shoemaker’s tales are compilations of stories he came across, and should not be confused as authentic folklore—we do not know how much of them came from his own imagination. In this case, you will be able to judge for yourself how Shoemaker’s yarn diverges from the published newspaper accounts.

The Gorilla

If Sir Rider Haggard was a Pennsylvanian he would doubtless lay the scenes of his wonderful mystery stories in Snyder County. It is in that ruggedly picturesque mountainous county where romance has taken its last stand, where the old touches the new, and ghosts, goblins and witches and memories of panthers, wolves and Indians linger in cycle after cycle of imaginative reminiscences. Every now and then, even in this dull, unsympathetic age, when the world, as Artist Shearer puts it, “is aesthetically dead,” Snyder County is thrilled

by some new ghost, witch, panther, or mystery story. The latest of these in the last days of 1920 and the first of 1921—the giant gorilla—has thrilled the entire Commonwealth by its unique horror.

The papers have told us how a gigantic man-ape escaped from a carnival train near Williamsport, and seeking the South, fled over the mountains to Snyder County, where it attacked a small boy, breaking his arm, held up automobiles, rifled smoke houses and the like, and then appeared in Snyder Township, Blair County, still further South, his nocturnal ramblings in that region proving an effective curfew for the young folks of a half-dozen rural communities.

This story sounds thrillingly interesting, but as gorillas live on fruit, and do not eat flesh, the animal in question would have starved or frozen to death at the outset of his career in the Alleghenies, and there the "X," unknown quantity of the real story begins. The newspapers have only printed the most popular versions of the gorilla mystery, only a fraction of the romance and folk-lore that sprang up mushroom-like around the presence of such an alien monster in our highlands. Already enough has been whispered about to fill a good sized volume, most of it absolutely untrue, yet some of the tales, if they have not hit the real facts, have come dangerously close to it.

Let the readers judge for themselves probably one of the most widely circulated versions among the Snyder County mountaineers, the hardy dwellers in the fastnesses of the Shade, Jack's and White Mountains, is the one about to be related. It is too personal to warrant promiscuous newspapers publication, and even now all names have been changed and localities altered, but to a Snyder County Mountaineer "all things are plain." This is the "authoritative," confidential Snyder County version, unabridged:

To begin with, all the mountain people know

Hornbostl Pfatteicher, whose log cabin is situated near the heading of Lost Creek, on the borders of Snyder and Juniata Counties. He has never been much of a worker, living mostly by hunting and fishing, prospering greatly during the days when the State raised the bounty on foxes and wild cats to an outrageously extravagant figure—but no one cares; let the hunter's license fund be plundered and the taxpayers be jammed.

He was also very noticeable during the Spring and Fall forest fires, which never failed to burn some part of his mountain bailiwick annually. He was opposed to Forester Bartschat, regarding him as too alert and intuitive, and made valiant efforts through his political bosses to have him transferred or removed. He was regular in his politics, could always have a hearing at Harrisburg, and though an ardent fisherman, saw no harm in the dynamiting or liming of streams, and upheld the right of "the interests" to pollute the waterways with vile filth from paper mills and tanneries. In other words he was, and probably is, typical of the professional mountaineer that the politicians, through the nefarious bounty laws, have maintained in the forests, to the detriment of reforestation and wild life.

Hornbostl, about 1915, was in love with a comely mountain girl, Beulah Fuchspuhr, the belle of Lost Creek Valley, but he was away from home so much, and so indifferent, and so much in his cups when in the neighborhood that she found time to become enamored of a tie-jobber named Heinie Beery, and ran away with him to Pittsburg.

During the flu epidemic, about the time of the Armistice, she was seized with the dreaded malady, and passed away, aged twenty-eight years.

Hornbostl was in the last draft, but the Armistice was signed before he was called to the colors, much to the regret of the better element, for he was the

sole pro-German in the mountains—a snake in a brood of eaglets—and all allowed he should have been given a chance to fight his beloved Kaiser. Though his name had a Teutonic flavor, he was only remotely of German ancestry, and should have known better than to root for a despotism—he, above all others, whose sole creed was personal liberty when it came to interfering with his "vested rights" of hunting and fishing out of season, and all other privileges of a lawless backwoodsman.

After attending the funeral of his wife in Pittsburg, he took the train to Philadelphia, and while there the news of the Armistice was received, consequently his grief was assuaged by this very satisfying information. He boarded on one of the back streets in the southern part of the Quaker City, in a rear room, which looked out on an alley where there were still a number of private stables or mews, occupied for the most part by the horses and carriages of the aristocracy.

Hornbostl liked to sit at the window after his day's work at Hog Island, smoking his stogie and watching the handsome equipages coming and going, the liveried colored coachmen, the long-tailed horses, with their showy brass mounted harness with jingling trappings, the animated groups of grooms, stable boys and hangers-on. Some of the darkies kept game roosters, and these occasionally strutted out into the alley and crowed when there was bright sunshine and the wind came from the "Summer Islands."

One afternoon he saw a strange spectacle enacted at the stable opposite his window. A large collection of moth-eaten and dusty stuffed animals and birds were unloaded from a dray—stuffed elks, horns and all, several buffalo heads, four timber wolves, with a red bear like they used to have in Snyder County, a golden eagle, with tattered flopping wings and a

great black beast that stood upright like a man were the most conspicuous objects. A crowd of mostly Negro children congregated as the half a hundred mangy specimens of this "silent zoo" became too much for Hornbostl, and putting his stogie between his teeth, sallied out the back door, hatless and in his shirt sleeves, a brawny rural giant who towered above the puny citified crowd.

He was greatly interested in that huge black beast which stood upright, and could not quite classify it, though its hair was like that of a black bear in its summer pelage. He sought out the tall Negro coachman who was in charge of the stable, and asked why a museum was being unloaded at that particular moment.

"Yer see its jest dis way" said the darkey, confidentially, "old Major Ourry have died an' 'is heirs dey didn't want de stuff about, so dey sent 'em down to de stable fer me to put in de empty box stalls."

As the conversation progressed the Negro intimated that the aforementioned heirs would be glad to sell any or all of the specimens at a reasonable figure.

"I'll give you ten dollars for that big animal that looks like a cross between a Snyder County black bear and a prize fighter," said Hornbostl.

"The gorilla, you mean," interposed the darkey.

"Yes, I mean the gorilla," answered the backwoodsman.

"It's yours," said the Negro with a grin, for he was to get half of the proceeds of all sales. He wondered why the uncouth stranger wanted a stuffed gorilla, but of all the animals in the collection, he was most pleased to get rid of that hideous effigy, the man-ape that might come to life some dark cold night and raise ructions with the horses.

Hornbostl offered five dollars more if the Negro would box the monster, and they finally arranged

to box it together and keep it in the stable until he would be let out at Hog Island. Eventually they got it to the freight station, billed to Meiserville.

At the time of the purchase it is doubtful if Hornbostl had any definite idea of what he was going to do with his "find," all that came later. Hornbostl was glad to return to his mountain home, and sank complacently back in his seat till the 11.30 A. M. train for Selins Grove Junction. It was an uneventful trip, for he was an unimaginative person, taking everything as a matter of course, though he did notice an unusually pretty high school girl with a wonderfully refined face and carriage, who got off the train at Dauphin, and followed her with his eyes as she walked along the street back of the station and across the bridge that spans Stony Creek, until the moving train shut her from view behind Fasig's Tavern. He thought that he had never seen anything quite so lovely before; if his late sweetheart who had run away had been one quarter as beautiful and elegant she would be worth worrying about.

He reached Meiserville well after dark, for it was almost the shortest day of the year, and put up there for the night. In the morning he inquired at the freight office for his consignment, but hardly expected it that soon. He had to wait three days before it arrived, but when it did, he secured a team which hauled it to his mountain retreat, depositing the crate in front of his door. After the teamster with his pair of heavy horses, decked out with jingling bells, departed, Hornbostl unpacked his treasure, and the huge, grinning man-ape stood before him, seven feet tall. It was set up on a platform with castors, so he ran it into the house, leaving it beside the old-fashioned open fireplace, where he used to sit opposite his mother while they both smoked their pipes in the old days.

That night after supper, when the raftered room was dark, save for one small glass kerosene lamp,

and the fitful light of the embers, the mountaineer sat and smoked, trying to conjure up the history of the hideous monster facing him across the inglenook. Instead of evolving anything interesting or definite, the evil genius of the man-ape, as the evening progressed, seemed to take complete possession of him. He became filled with vicious, revengeful thoughts; all the hate in his nature was drawn to the surface as the firelight flashed on the glass eyes and grinning teeth of the monstrous jungle king. All at once the maelstrom of nasty thoughts assumed coherent form, and he realized why he had brought the gorilla to Snyder County.

He had heard since going to Philadelphia that the hated Heinie Beery had taken a tie contract on the Blue Knob, the second highest mountain in Pennsylvania, somewhere on the line between Blair and Bedford Counties. He wanted to kill his rival, and now would be a chance to do it and escape detection. He would dress himself up in the hide, and proceed overland to Snyder Township, reconnoitre there, find his victim and choke him to death, which the Negro coachman had told him was the chief pastime of live gorillas in the African wilds.

Suiting the action to the word, he drew his long knife and began cutting the heavy threads which sewed the hide over the manikin. He soon had the hide lying on the deal floor, and a huge white statue of lath and plaster of Paris stood before him, like an archaic ghost. He did not like the looks of the manikin, so pounded it to a pulp with an axe to lime his kitchen garden. The hide was as stiff as a board, but between the heat of the fire and bear's grease he had it fairly pliable by morning. By the next night it was in still better shape, so he donned it and sewed himself in. Physically he was not unlike the man-ape, being gross about the abdomen, sloping shouldered and long-armed, while his prognathous

jaw and retreating forehead were perfect counterparts of the gorilla's physiognomy.

Arming himself with a long ironwood staff, he started on his journey towards the Blue Knob country. He had to cross the Christunn Valley in order to get into Jack's Mountain, which he would follow along the summits to Mount Union. It was a dark, starless night, and all went well until he suddenly came upon the scene of a nocturnal wood chopping operation. The wood-cutter, a railroader, had no other chance to lay in his winter's fuel supply than after dark, and by the light of a lantern placed on a large stump had already stacked up a goodly lot of cordwood. His son, a boy of fourteen, was ranking the wood. At the moment of the gorilla-man's appearance in the clearing the man had gone to the house for a cup of hot coffee, leaving the lad alone at his work. The boy heard the heavy footfalls on the chips, and thinking his father was returning, looked up and beheld the most hideous thing that his eyes had ever looked upon. He uttered a shriek of terror, but before he could open his lips a second time the "gorilla" was upon him, slapping his mouth until the blood flowed, with one brawny paw, while he wrenched his arm so severely with the other that he left it limp and broken, hanging by his side. Then the monster, looking back over his shoulder, loped off into the deep forest at the foot of Jack's Mountain.

The boy, more dead than alive from fright, was found a few minutes later by his father, to whom he described his terrible assailant.

After that the man-ape was more careful when he traveled, although he was seen by half a dozen persons until he got safely to the vicinity of "the Monarch of Mountains."

Blue Knob is a weird and impressive eminence around which many legends cluster, some of them dating back to Indian days. Its altitude at the new

steel forest fire tower is 3,165 feet above tide. "The Lost Children of the Alleghenies" is a beautiful word picture of the disappearance of two little tots on the slopes of Blue Knob, from the gifted pen of Rev. James A. Sell, of Hollidaysburg.

Heinie Beery was living alone in a small shack on Poplar Run, a stream which has its heading on the slopes of Blue Knob, not far from the home of the mighty hunter, Peter Leighty. Since the loss of his wife he was gloomy and taciturn, and refused to live with his choppers and teamsters in their big camp further down in the hollow.

While searching for Beery, the man-gorilla was seen by several of the woodsmen, and the lonely camp was almost in a panic by this savage visitation. The man-ape was glad that his outlandish appearance struck terror to all who saw him, else he might have been captured long before. He watched his chance to get Beery where he wanted him and in the course of several days was rewarded. Meanwhile he had to live somehow, and at dead of night broke into smoke-houses and cellars, eating raw eggs and butter when hunger pressed him hard. In some ways it was no fun playing gorilla on an empty stomach.

One Sunday afternoon Beery, after eating dinner with his crew at their camp near the mouth of the hollow, started on a solitary ramble up the ravine which led past the small shanty where in the local vernacular, he "bached it" towards the top of the vast and mysterious Blue Knob. Little did he know that the man-ape was waiting behind his cabin, and followed him to the summit, which he reached about dusk, and sat on a flat rock on the brink of a dizzy precipice watching the lights flashing up at Altoona and Johnstown, the long trains winding their way around Horse Shoe Curve. He heard the brush crack behind him, and looking around beheld the hideous monster that he had supposed his work-

men had conjured up out of brains addled by too much home-brew.

Heinie Beery was a fighting Dutchman, but on this occasion his curly black hair stood straight on end, and his dark florid face became as ashen as death. He lost his self-control for an instant, and in this fatal moment the giant "gorilla" gripped him behind the shoulders and sent him careening over the precipice "to take a short cut to Altoona."

With a shout of glee the monster turned on his heel, his mission accomplished, to return along the mountains and through the forests to his cabin near the sources of Lost Creek. He was seen by a number of children at Hollidaysburg and Frankstown, late at night, frightening them almost out of their wits; he terrified several parties of automobilists near Yellow Springs; he had all of Snyder Township in an uproar before he had passed through it, but he eventually got to Shade Mountain safe and sound.

Once on his home mountains, overlooking Lewistown Narrows, a strange remorse overcame him; he began to regret his folly, his odd caprice. He sat on a high rock near the top of the mountain, much in the attitude of Rodin's famous "Penseur," and began to sob and moan. It was a still night, and the trackwalkers down in the valley heard him and called to him through their megaphones. But the more they called the worse he groaned and shrieked, as if he liked to mystify the lonely railroad men. At length he got up and started along the mountain top, wailing and screaming like a "Token," until out of hearing of the trackwalkers and the crews of waiting freight trains. He had played a silly game, made a monkey of himself and was probably now a murderer in the bargain. He could hardly wait until he got to his cabin to rip off the hideous, ill-smelling gorilla's hide, and make a bonfire of it. He hoped that, if no evil consequence befell him as

a result of his mad prank, he would be a better man in the future.

However, as he neared his cabin, all his good resolves began to ooze out of his finger tips. By the time he reached the miserable cabin he decided to stick to his disguise, and continue the adventure to the end, come what may. If he would be shot down like a vile beast, it would only be retribution for Heinie Beery hurled off the crag of Blue Knob, without a chance to defend himself. The night was long; he would travel until morning and hide among the rocks until night, picking up what food he could along the way.

In his northward journey he had many thrilling experiences, such as crossing the covered bridge at Northumberland at midnight, riding on the trucks of a freight train to Jersey Shore and frightening fishermen at Hagerman's Run. When last seen he was near the flourishing town of Woolrich, frightening old and young, so much so that a young local sportsman offered a reward of "five hundred dollars dead, one thousand dollars alive," putting the Snyder County gorilla in the same category with the Passenger Pigeon as a natural history curiosity.

And in this terrible disguise Hornbostl Pfatteicher is expiating his sins, black as the satanic form he has assumed, and when his penance is over, to be shed for the newer and better life.

What is particularly interesting for us, beyond the fact that the idea of a "gorilla suit" in hoaxes goes back almost a century, is that Shoemaker's story is based on reported sightings of a gorilla-like beast. From late 1920 to early 1921, newspapers throughout central Pennsylvania published sightings by excited witnesses. While these reports are not confirmative proof of a biological Bigfoot, they do point to a historical ethnoknown Bigfoot, in that sightings of a large ape-like creature were published long before

the 1950s. The articles which follow are arranged chronologically to show how this remarkable "gorilla" flap unfolded. [Note that in the first news story, the original article follows a news flash that was inserted at the beginning.]

Snyder County Boy Claims a Huge Gorilla Attacked Him

Young Bolig, Roughly Handled by
Some Ferocious Animal,
is Positive it Was a Big Ape
Knocked Down And Injured
Story Gives Color to Report That
Ape Escaped From Carnival
at Williamsport Last Summer

Story Verified

At 2 o'clock this afternoon Charles Bolig of near Meiser, Snyder county, came into the news rooms of The Sentinel, to verify the story that his son had been attracted [*sic*] by a huge ape, supposedly an escaped gorilla from a carnival company, that has been roaming about the woods near Meiser for at least several weeks.

Mr. Bolig in his graphic account of the affair said that his twin children, Samuel and Margaret, aged 15 years, first saw the ape three weeks ago when they heard a peculiar noise near the Bolig wood pile. Securing a searchlight they investigated and plainly saw the uncouth form of a giant ape. They looked at the animal in open mouth amazement and after staring at them on its hind legs for a few moments, the animal dropped upon its four legs and scurried away into the nearby woods.

The animal's cries were heard nightly for a week after that, but no sign of the brute was seen until a week later when young Sam Bolig saw him standing

in a corn field on the Bolig farm. The youth had a 22 calibre rifle with him and raising the slight gun took careful aim at the beast's breast, pulled the trigger and fired. The animal fell to its feet, rolled over as if in agony and then managed to again scamper away. He was tracked by a trail of blood into the woods.

The third encounter occurred last Friday evening between 7 and 8 o'clock while Mr. Bolig was chopping wood. The Bolig twins in the house heard the peculiar throated noise made by the gorilla and Samuel armed himself with a 32 caliber revolver, went to investigate, followed by his sister. They saw the animal standing upright under an apple tree not more than ten feet from the house. The boy raised his arm to fire, but before he could pull the trigger the ape leaped upon him and smote him to the ground. In response to his son's and daughter's terrified calls for help, Mr. Bolig, armed with an axe, rushed to the scene. The brute saw him coming and fled.

Mr. Bolig declares that fully 100 armed men are today scouring the vicinity of his home in the hope of meeting up with the animal, which is generally believed to be the gorilla that escaped from a carnival company early last summer at Williamsport.

Color to the persistent rumors that a full grown gorilla, or some other gigantic member of the monkey family is at large in Snyder county and has been roaming through the woods there since last summer, when the animal is alleged to have escaped from a carnival showing at Williamsport, has been provided coming in the form of a savage attack upon a fifteen year old boy named Bolig, who resides along the mountain a mile and a half from Meiser, along the Sunbury line.

For several months reports have been filtering into Snyder and Northumberland county towns that

a huge ape has been seen in isolated woody sections, but these reports could never be verified and were generally discredited, but now the unfortunate lad's story has set the whole community agog with excitement and talk of armed searching parties being formed is rife.

Charles Bolig resides one and a half miles south of Meiser, between Middleburg and Creamer, along the mountain. Mr. Bolig has a fifteen year old son, who with his father, were chopping wood at their home at the mountainside by night. They had a burning lantern by their side. The boy relates the following story of his encounter with an animal that he called a gorilla: "The gorilla standing upon its hind legs appeared to be seven feet high. After its attack upon me it ran away before my father had an opportunity to see it. When the gorilla sprang away it did not seem to be such a big animal."

The boy's father came to Creamer and to Lewistown yesterday and told his friends the boy's story of the encounter with the animal. Harry Faux of Lewistown passing through Middleburg yesterday met Mr. Bolig who narrated the lad's experience to Mr. Faux.

This morning it was reported that the gorilla had appeared along the mountain sides of Lewistown Narrows where some travelers alleged they saw the animal last night.

Reports from Meiser today were that the Bolig boy was knocked unconscious by his assailant, the gorilla, and that the lad is confined to his bed, in a semi-conscious condition with a broken arm and badly bruised places on his body.

It is reported that a circus or carnival train was wrecked near Williamsport last summer, and that a gorilla escaped from a car at that time, and that the animal was not captured. It is believed that the ape roamed over the mountains in the vicinity of Sunbury

and Northumberland until it came to the Bolig residence where it attacked the boy several days ago.

Telephone wires to Kreamer and Meiser were not working well this morning and The Sentinel reporters quickly resorted to interviews with Lewistown persons who had talked with persons to whom Mr. Bolig related the thrilling experience of his son, as described above.

Mr. Bolig who was in Lewistown yesterday visited the Charles Gilbert family, South Spruce street, and related the story of his son's attack by the animal thought by the lad to be a gorilla.

Mr. Bolig came to the railroad station at Kreamer where he narrated the story of the appearance of the gorilla and its assault upon the boy, as told by the boy himself.

From: Lewistown, PA, *The Daily Sentinel*
December 14, 1920; pp. 1, 2.

\$500 Dead or \$1,000 Alive for Gorilla Says Bolig

Father of Boy Attacked by Creature Declares Carnival
Company Has Offered That Amount of Reward
Prowler Raids Bolig's Cellar
Apples and Other Provisions Taken and Owner
Thinks Animal Was Foraging for Food

Charles Bolig of near Meiser, Snyder county, whose fourteen year old son Samuel was attacked by an animal said to be a gorilla, a few days ago, is a guest of his brother-in-law, Charles Gilbert, 216 South Spruce street, Lewistown. Mr. Bolig is in Lewistown, awaiting the return of John H. Miller from Philadelphia. The two men intend to make a trip to Mr. Miller's coal mines in Huntingdon county.

Mr. Bolig is besieged by persons who come to him, desiring to secure information about the gorilla or

ape that attacked his son, Samuel, a few nights ago, at the Bolig residence, along the mountain, one and a half miles south of Meiser.

Mr. Bolig today entertained many Lewistown persons as he related the thrilling story of the gorilla's three appearances at the Bolig home. The father declares that he himself has not been able to get a view of the mysterious animal that is terrorizing Snyder county.

Today Mr. Bolig reiterated his description of the three visits of the gorilla to his home, saying that the beast made its first appearance three weeks ago. A week later it came back and his son shot at it with his 22 calibre rifle, the ball hitting the animal upon its breast, causing it to reel and bleed from the wound. Upon its third appearance the boy Samuel attempted to shoot it with his revolver. He snapped the trigger three times, each time the weapon refusing to discharge its load, with the gorilla only ten feet away from the lad.

The gorilla becoming enraged by the boy's actions assaulted the lad throwing him to the ground and tearing most of his clothing from his body and almost strangling him to death. For two days the boy was confined to his bed. He is now able to be up and around. Claw marks and skin abrasions made by the gorilla, cover the boy's form from face to feet.

Samuel described the animal as having a color between black and brown, a human-like face and large lips. It walked upon its two hind legs and was at least, says the boy, seven feet high. When it ran away it moved upon its four legs.

Mr. Bolig discovered blood on the ground, after his son had shot and wounded the gorilla on its second visit to the Bolig residence. The trail of blood was lost in the leaves of trees.

Articles of food disappeared from the cellar of the Bolig home and it is believed that the gorilla in

search of something to eat has been making nocturnal visits to the cellar. Apples partly eaten were found just outside the apple bin where a night prowler evidently has been making his regular visits.

None of the members of the Bolig family venture outside of their home without being armed. More than a hundred people visited the Bolig residence last Sunday, attracted there by a desire to get a description of the strange animal and to discover some clue that will lead to its capture.

Mr. Bolig stated yesterday that rewards have been offered for the capture of the gorilla, \$500 if captured dead and \$1,000 if caught alive. He claims these rewards have been offered by the carnival company from whom the animal is said to have escaped.

Skilled hunters are confident that the gorilla will be captured when the first snow fall comes and the animal will leave its tracks in the snow. There are extensive caves and mines in close proximity to the Bolig home and it is believed that the gorilla has established his habitat in one of the underground passage ways.

From: Lewistown, PA, *The Daily Sentinel*
December 15, 1920; p. 1.

Is There a Wild Beast in County?

Rumors flying hither and thither the past week or two are yet to be proven facts, in the case of the supposed attack on a 15-year-old lad, south of Globe Mills, by a gorilla, or other "man-like" wild beast.

The story could be lengthened into columns, but the skeptics and the "doubting Thomas'" seem to be in the majority, and nearly all whom we have interrogated say "there's nothing to it."

The "gorilla" has made two or three attacks on the same person, and has, within a day or so, been "seen or heard" south of Globe Mills, north of Middleburg, and next in the Narrows, at Lewistown!

But hunters are on the "path" and are awaiting snow for tracking before they have hopes of bagging the "beast."

One Middleburg man assures us that there are only three gorillas in captivity in the world today, and that if one were in this climate it would die within 24 hours!

At any rate, the animal has been described as ranging from the height of an undersized man to that of more than seven feet! and is "hairy" and "strong."

We hope the story is true, and that the animal or beast may be captured—we wouldn't dare hope it isn't true, because the lad is lying in bed, one knee dislocated and has other bruises, showing him to have had some rough handling by some thing, and, especially because the people all over Central Pennsylvania have been interested in it in full belief; and a lot of them saw tracks and other evidences! As above stated, we hope it true, and that the beast may be captured, and placed on exhibition, so that "all who pass may see." We are sorry that the lad was a victim if the report of the attack is substantially correct.

From: *Snyder County Weekly Herald*
December 15, 1920: p. 1.

Gorilla Attacked Samuel Bolig

For the past two or three weeks there has been so much talk about a gorilla in the neighborhood of White Top school house and near the home of

Charles Bolig on the Solomon Lauver farm, just south of Meiser church, and it was all considered a joke.

The story is now well authenticated, because Sam Bolig, 14-year old son of Charles Bolig, was attacked Thursday evening of last week by this strange animal, and the boy was badly mutilated. His trouser leg was torn off, his body was bruised and scratched, and the boy was compelled to go to bed for several days.

The animal moves on all fours and is covered with a growth of hair and resembles pictures of the gorilla or chimpanzee, and makes a noise like a horse.

The strange creature was first seen three weeks ago by Allen Hummel and his wife, but fearing the story might be discredited, did not reveal their experience. It was also seen after butchering by Fred Klase, Benjamin Hoffman and six times by the Bolig family.

Saturday evening, Dec. 4th, while Sam Bolig was hunting in the clearing near White Top School House he saw the animal and fired a shot with a flobert rifle. The animal fell, jumped up again. Later Sam and his elder brother, Frank, went out and discovered blood where the animal fell.

Thursday evening, Dec. 11th, Sam again went out back of the barn with a revolver while his father was cutting wood with the light of a lantern. It was there that Sam got the worst of the encounter. The animal threw the boy on the ground. The boy yelled for help and the father came rushing to the rescue, and it is thought that the light of the lantern made the animal turn tail and depart.

It is said that when dogs scent the trail of the strange animal, they depart in another direction, not caring to follow the trail.

Quite a number of hunters were out trying to capture the monstrosity Saturday and Sunday and

up to the time of going to press, he has not been captured.

From: Middleburgh, PA, *Post*
December 16, 1920; p. 1.

Gorilla Affair Seems Good Story at Least

Brave Men Scouring Hills in Large Numbers Since the
Animal's Reported Pranks Obtained No Clue as to Identity
of Beast

Now that it's had sufficient time for the excitement of the moment to subside and for the show-me test to be applied the people out Globe's Mills way scout the sensational report of Friday that a youth there was attacked by a gorilla or some other equally wild and ferocious animal.

The community was aroused to high pitch and brave hunters swore vengeance on the unwelcome intruder because of the story which came from the Charles Bolig home, a few miles back of Globe Mills.

It was a harrowing tale. The narrative told how the other evening the father was working by lantern light at a woodpile and that his 13-year-old son, Samuel, was coming thru the barnyard to help carry in the kindling for the night. As the lad passed thru a gate, a hairy animal about the height of the youngster, jumped from his fence perch and grasped the boy in his arms.

They fell to the ground and the "gorilla" squeezed him so tightly that the boy's clothes were torn. The youngster yelled for help and his father hastened to his rescue. Before the help arrived, tho, the animal with one claw took hold of the boy's leg above the knee and with the other claw grasped him below the knee. Then the attacking beast gave a quick pull and a jerk. The knee was dislocated, and

while the victim writhed in pain, the strange animal hopped away.

The youngster related that the beast looked like the monkeys he had seen in circuses. The report has been current a fortnight that a gorilla escaped from a carnival company in Williamsport, and was believed to have been seen in the vicinity of Montgomery and Milton.

Community hunters were on their return from the mountains, where they had killed many deer and a few bear. They were full of the spirit of the hunt, and determined to run to earth the unwelcome invader. They went over the hills by day and by night in numerous parties, but of a gorilla, a wildcat or any other equally ferocious animal they saw not a one. Neither could they find another person in the community who has seen what the Bolig lad reports he beheld.

So they have decided the lad's clothing was torn in another way, and they are ready to compliment his imagination.

From: Selinsgrove, PA, *The Times*
December 16, 1920; p. 7.

Gorilla Some Traveler, Ape Seen in Blair County, People Scared

Canoe Creek Residents Meet With Strange Beast,
Resembling Ape, Loitering Along Road and
Several Persons Have the Scare of Their Lives

The following is taken from today's issue of the Altoona Times-Tribune:

A good many Blair county people when reading of the escapades of the wild ape in Snyder county, thought perhaps the brand of the beverage consumed may have had something to do with the inception

of the story, but truth is stranger than fiction. Blair county has a story which is a top notcher, compared with the Snyder county story, while similar in many respects.

When Samuel Brannen, a Canoe creek resident came home from work on Tuesday he observed that his 12 year old son, Chalmer, had neglected to get in kindling for the starting of the morning fire in the kitchen range. The youth lighted a lantern and went out to the wood pile to gather some chips. There is a high wire fence between the wood pile and the road.

Looking up from his work, young Brannen was startled at seeing a brownish form, resembling as nearly as he could describe when he recovered from his fright, an ape. The thing ran toward him, but coming in contact with the wire fence, was knocked backward. The youth ran into the house and summoned his father and mother.

When they came out, seeing what confronted them, Mr. Brannen went into the house for the gun. When he returned the thing was gone. A peculiar coincidence in connection with this is that the same night something entered the smoke house on the George Mattern farm, nearby, and took two pieces of meat.

There was no lock on the door of the smoke house, but a button held the door shut. Whatever or whoever entered, did not turn the button, but pulled it off. One piece of meat partly eaten, was subsequently found, no trace has been found of the other.

The same night, Mike Sutlige, an Austrian, who lives nearby, was going to the post office. Mike met the same thing on the road. He was scared and ran like a deer. He came to the home of a neighbor. He did not stop to knock, or even turn the door knob. He just burst into the house. His description of the

thing was so badly mixed between Austrian, English and profane language, that it is unprintable, even if accessible.

The latest report from the scene of the curious nocturnal visitor is that a posse is being recruited to make a hunt of the neighborhood for it.

From: Lewistown, PA, *The Sentinel*
December 17, 1920; p. 1.

"Missing Link" Bobs Up Again, Its Cries Terrorize Narrows Section

Scores of Railroad Men Hear Screams Along Juniata
River—Signalman Answers Cries and "Animal"
Descends From Mountain to Water's Edge

In its issue of today the Harrisburg Patriot prints the following:

"The wild animal, believed to be an ape or gorilla, came out from its hiding place again on Saturday night and gave the mountain dwellers in the Lewistown Narrows section a real thrill.

"The animal was not seen by anyone on Saturday night but scores of men, posted at various points of the mountain declare that they have heard screams that could have been made by nothing other than some kind of an animal that is altogether strange to that part of the country.

"On Saturday night the strange cry was first heard from 'the knob' which is on the eastern bank of Macedonia Hollow on the State road side of the Lewistown Narrows.

"More than a score of railroad men who work in the Denholm yards of the Pennsylvania Railroad listened to the cries for hours. They described it as a terrific cry like that of a child in distress, but greatly magnified.

"When first heard it was just across the Juniata River opposite the "MI" tower of the Pennsylvania Railroad. The railroad men thought that the beast was traveling across "the knob" in the direction of Middleburg, as the volume of the voice was decreasing.

"As it grew less audible M. C. Hack, a signalman, ran to the tower and obtained a megaphone, and returning, sounded the "calls of the wild," as known to the mountain folks of the Juniata Valley.

"The animal answered at once with a shrill scream. As Hack continued to call the cries of the animal came nearer until it seemed that it had descended the mountain and was at the water's edge. For a while it stayed there and later its screams indicated that it was climbing "the knob" and finally its voice faded away as it traveled away over the hills.

"Veteran mountaineers residing in the section declare that they have never heard anything like it in the mountains there. They discredit the theory advanced by some that the strange cry is that of a panther, although one is said to have been seen near Millerstown about a week ago and David Hough, an old mountaineer, residing in Granville Gap says that a hunter brought a panther cub to his home late in the big game season which was caught in the "Vincent chopping," one of the wildest sections of the Black Log Mountain.

"Although many have accepted the theory that it is an escaped gorilla that broke away from a carnival company at Williamsport last Summer, many others doubt this. Residents of the terrorized section have nick-named the animal the 'missing link.' Regardless of what it is few residents of the rural districts will leave their homes unless they are heavily armed.

"When last seen by anyone the animal appeared at the Bolig home, just across the Snyder county line. On this occasion it attacked and injured Samuel

Bolig while the boy was trying to shoot it with a revolver that missed fire several times. The boy gave a complete description which closely followed that of a giant gorilla."

From: Lewistown, PA, *The Sentinel*
December 20, 1920; p. 1.

Say Beast Leaped at Car

Middleburg. Pa, Dec. 20—While Mr. and Mrs. Bruce P. Yeager were driving along a dark road near here early Saturday, a huge animal that looked to be seven feet high and to have arms and legs like telephone poles jumped at their car, missed it and fell sprawling on the road. Yeager fired two shots at it but the animal made off into the woods and has not been seen since.

Yeager thinks it was the same animal that attacked a boy near Meiser last week, although the spot where it attacked the Yeagers is four miles from where the boy lives. It is believed the animal is an ape that escaped from a carnival company at Sunbury last summer.

From: Lewistown, PA, *The Sentinel*
December 20, 1920; p. 1.

More Evidence Shows Simian As Still Active

Dispatch from Hollidaysburg Declares Town is
All Agog Over Appearance of Ape

Hollidaysburg, PA., Dec. 21—The escaped gorilla that has been prowling about Hollidaysburg and vicinity for the past several days, has a great fondness for chicken, as is evidenced by the fact that it

has invaded several coops at night and feasted to its heart's content on the tender juicy meat. The big animal visited the Manning farm at the west end of Chimney Rocks, on Sunday night and broke into the chicken coop, where it enjoyed a royal feast on fifteen fine hens, afterwards taking a siesta on a pile of straw. In the morning when a member of the family visited the coop, the place was found to be littered with feathers and blood, and on the straw was a depression where the ape man had slept.

At Roselawn, the beast's footprints were seen the latter part of last week, in the soft mud near the Brush Run and it was at first supposed to be a bear, but was later seen by several persons who declare it was of the shape of a huge ape. It broke into the chicken coop of George Brenner and Mike Wiseman, and feasted on a number of choice fowls.

The town is all agog over the appearance of the animal and the boys and girls are keeping close to the house after nightfall. The young men whose girls reside in the rural districts are making their nightly visits to their sweethearts all cranked up ready to shoot into "high" if the dreaded monster appears in their path. Most of the swains are armed with revolvers, but they might as well shoot at the big creature with a pop gun, unless using a weapon of great power and large calibre, as the gorilla is one of the largest and most powerful of all wild animals. Its muscles are like iron and the bullet from an ordinary revolver would do it little or no harm. The gorilla is so powerful and ferocious that even the lion will retreat before it, and there is no other animal in the African jungle that will face it. This creature has such great strength in its arms, that it can tear a large branch from a tree with the greatest ease and crush a man like an eggshell. If the unwelcome visitor remains in this section a concerted movement will be made to hunt it down and kill it,

as its presence here is a great menace to the safety of the people.

Hearing a slight noise on the road ahead, as though something or someone was coming through the bushes into the road, Lester Bucher and Chester Fink, of Eldorado, who were coming down the long hill from Duncansville to Cross Keys at 10 o'clock last night in Fink's automobile, sounded the horn and gazed to the side of the road as they passed the object, only to be horrified as the spotlight crossed the thing to find it a brown colored animal, between six and seven feet tall and standing erect beside the road facing them.

Almost senseless with fear, Fink shoved the gears into high and the car rapidly left the supposed jungle denizen behind. As the automobile got a few feet beyond the thing it emitted a horrid yell, which the young men describe as "loud and course." Neither had a gun and for this reason no further attempt at investigation was made. Talking of the incident later, young Bucher stated that they both got a good look at the thing as the light played on it and they have no doubt but that it was a gorilla or an animal closely resembling it.

From: Lewistown, PA, *The Sentinel*
December 21, 1920; p. 1.

Now Its Called the "Missing Link"

The wild beast which has been credited with making it's headquarters near Globe Mills, this county, has sure been going some the past week. The good judgment of most all men in Central Pennsylvania is beginning to be doubted, and the animal, wild, tame, or otherwise, bobs up simultaneously in Northumberland, Snyder, Union, Mifflin, Juniata,

Perry, Centre and Blair counties! The best shots, the most composed men, and the oldest natives of these different counties have all been within firing or hailing distance of this unusual thing, and all are in one accord that it doesn't belong to these parts. And since it has not been brought to close enough view of any one rationally able to give it a name, it has been called the "missing link."

The story seems to have originally gained much of its impetus in Lewistown, where the dispatch going to the daily papers leaves the readers of the account under the impression that the whole thing started "just across the line" from Lewistown. Hardly any one in Snyder county wants to claim the blamed thing, and we readily admit that it looks as tho some correspondent to the daily papers was rather short of "long green" and decided to "suck the dailies for spending money."

Reminds us of the perfectly good advertising this county received the time that gold was discovered in paying quantities not far from our sister town, Beavertown. Some people believed it—others didn't. About the same condition exists in the present controversy, only we think the Lewistown correspondent is making too much spending money on the wild animal.

Maybe it's a case of too much "Hootch" and a vivid imagination?

From: *Snyder County Weekly Herald*
December 22, 1920: p. 1.

Shopman's Find Seems to Show Gorilla is Bear
Discovery in Blair County Apparently Leaves
Snyder County Its Ape Fame

Altoona, Pa., Dec. 23—People of Blair County

can now breathe freely once again and venture from their homes without fear of being torn to shreds in the powerful arms of the dreaded gorilla, as the animal that has been prowling about various parts of the county of late, breaking into hen coops and smoke houses, and seen indistinctly at night by several persons, is doubtless nothing but a big black bear, as such an animal was seen yesterday morning on the Catfish Ridge. Therefore the gorilla that escaped last summer from a carnival at Williamsport and visited the Bolig farm in Snyder county recently, where it attacked and badly injured Sam Bolig, is still in that section or some other place than this county.

John C. Helsel, a resident of McKee, is employed under Frank McLaughlin of the Pennsy carpenters gang at Hollidaysburg and drives from his home to Hollidaysburg every morning to his work. Yesterday morning shortly after daybreak he was driving over the Catfish Ridge on the county road, when he saw some shaggy-looking creature moving in the woods near the road. Determined to see what it was, he stopped the car, and a large black bear appeared in plain view a few feet from the car. The bear took his own good time in shambling off into a nearby woods.

From: Lewiston, PA, *The Sentinel*
December 23, 1920: p. 1.

The Widely Known Gorilla Story is Beaten to Death

Exaggerated Gorilla Stories Have Accumulated So
Rapidly that All have Lost Faith In It and It Is
Now Consigned to the Department of Myths

The Snyder County Gorilla has not been shot,
but he is certainly dead. Not in many a year have

there been so many stories told about a wild animal as there has been about this alleged gorilla.

From newspaper stories, he has been seen in Sunbury and Altoona at the same time, shot at a number of times near Globe Mills, escaped from a circus at Williamsport, then at Sunbury; one day he was seven feet tall; next day he was eleven feet tall with hands that reach in the ground; carried a lot of pumpkins in the cave; next day gave birth to twins; does his own cooking in the cave.

Next we expect him to come to Middleburg to register as a voter, but don't know whether male or female, then we expect him to lay in a good supply of winter clothing as gorillas are accustomed to a warmer climate. Then again they say gorillas can not survive in captivity; another that they can not live in this climate. Again there are only three gorillas in captivity, and they are worth \$12,000 each.

What is a Gorilla?

Our books say a gorilla is an African product, never exceeds five feet, six inches, in height, has thirteen pairs of ribs, the skeleton looks like that of the human being, except that the hands reach to the knees, and the great toe extends away from the foot like the thumb of the hand, and the legs are shorter than the human legs. The skin is black, covered with short, dark gray hair, reddish brown on the head. The Gorilla is a voracious feeder, its food being exclusively vegetable, obtained partly by climbing trees, and partly on the ground. It is very fond of fruits, and some vegetables as the fleshy parts of the leaves of the pineapple and employs the great strength of jaws and teeth in tearing vegetable substances and cracking nuts which would require a heavy blow of a hammer. It inhabits exclusively the densest parts of tropical forests and is found only in regions where fresh water is abundant.

The fact that the gorilla feeds on vegetable matter exclusively eliminates the gorilla from the possibilities of the animal that attacked 14-year old Samuel Bolig, as this animal is said to have frequented places where families had butchered during the day.

Practically all the newspapers in Central Pennsylvania have published some version of the gorilla story, and for a time many people had some faith in this story, but unless the animal is captured very soon, the whole story will be classed as myth.

From: Middleburgh, PA, *Post*
December 23, 1920: p. 1.

"Missing Link" May Be Canadian Lynx

Hunter Offers Explanation and Recalls Similar Case

Harrisburg, Pa., Dec. 27—The mystery of the "missing link" which has been terrorizing residents of Mifflin and Snyder counties and which is believed by many to be a gorilla which escaped from a circus some months ago, may be a Canadian lynx. H. A. Batchell of Trenton, N. J., who offers this solution of the puzzle, gives an account of an experience he had with a similar animal some years ago, in support of his theory.

The mystery animal which has been running amuck in Snyder and Mifflin counties has been described as a huge, hairy animal, and so bold that it recently attacked Samuel Bolig, the 15-year-old son of Charles Bolig, near his Meiserville home. The beast has been seen by several other persons, and while their descriptions differ in some minor details the general opinion of all is that it resembles a "wild ape" in appearance.

In offering his suggestion that the animal may be a Canadian lynx, Mr. Batchell relates the following

tale of his experience with another "missing link" in Maryland:

"About thirty years ago I was hunting squirrels along the east side of Fair View Mountain, several miles west of Clear Spring, Md., in the direction of Blair's Valley. While moving cautiously along the mountain slope in the direction of a large hickory tree, I was startled by a swishing noise about thirty yards ahead, and a large animal, with reddish hair and no tail, sprang down the mountain side, over the tops of the bushes ten feet high, and landed about forty feet of where I stood.

"I gripped more firmly my trusty 12-gauge Parker with one hand and with the other reached for my hat, which was recovered just hairs' length from my head and not even a gentle breeze was stirring. I returned down the mountain side without waiting to see what the animal would do.

"Upon my return to Clear Spring that evening I related my experience to my companion of the chase, the late Samuel M. Beltzell. He told me that some animal had been the terror of people living on that mountain for miles around.

"The people were frightened by noises similar to those of the 'missing link' which has the people of Snyder county so perturbed. One evening, several weeks after this incident, I was called upon to view a dead animal that had been killed about a mile from the place where I had seen the live one. It had a remarkably short tail and long tufts of hair at the end of its ears and the side of its jaws.

"It was short bodied and had a coat of short reddish fur of which some one later made a pair of driving gloves. Aside from its night-long distressing cries, it was charged with carrying off a farmer's young pig, and it was a subsequent visit to that farmer's pig pen that proved fatal to the animal. I learned that the animal was a Canadian lynx.

"The lynx, although it is really a formidable beast, has apparently never been known to attack a man unprovoked, and when captured young it can be easily trained. This is very remarkable as it is a blood-thirsty animal and when it gets access to a sheep fold, it destroys a large number of sheep. I think it is barely possible that the animal which is terrorizing the residents of Snyder county may prove to be a Canadian lynx or a member of its family."

From: Lewistown, PA, *The Sentinel*
December 27, 1920: p. 1.

Gorilla Develops Into Witch

Francis Kratzer, of route four Middleburg, who lives in the "Gorilla" district, was in town Thursday and called at this office. He reported that he now believed that instead of it being a gorilla, the suspicious creature was a witch.

Mr. Kratzer has accompanied the Bolig sons on several expeditions in search of the ferocious animal that has been terrorizing many communities in the state.

From: Middleburgh, PA, *Post*
January 6, 1921; p. 1.

Gorilla Bobs Up Near Gettysburg

The gorilla that started on his rampage up in the Alleghenies a few weeks ago and was later seen in Path Valley, has apparently progressed as far east as Gettysburg.

According to an unfounded report a huge gorilla was spied sitting on a rock near Mount Rock

Wednesday afternoon. When the monstrous animal saw that it was discovered by some Mount Rock citizens it arose, stretched itself, and disappeared into a nearby wood, according to the report.

When told this story one Gettysburg citizen said, "It is evident that some of my Mount Rock friends are seeing more peculiar visions now than they did before the advent of the Eighteenth amendment."

From: Waynesboro, PA, *Press*
January 21, 1921: p. 6.

That Pesky Gorilla May Have Robbed the Chamberlin Meathouse

It seems like going far afield to solve the mystery of Farmer Wm. C. Chamberlin's smokehouse robbery, in which he lost eight elegant hams, as told by this paper, to venture a guess that the culprit may have been the escaped gorilla, which has been depredating about the mountains in this county and in Adams county, and yet more unlikely things have happened. The Gettysburg Times of yesterday following a report of the gorilla having been seen about Mount Rock last Wednesday, tells the following:

"That the story of a huge gorilla frightening the people of Adams county is not a myth but an actual fact is the emphatic statement of northern county residents who late Thursday night took part in a general chase in the vicinity of Idaville.

"For several days reports believed to be entirely unfounded reached Gettysburg from northern county people stating that they had seen an animal believed to be a gorilla prowling about their property. At first these reports were discredited by the majority of people who heard them but now are known to have originated from authentic sources.

"Thursday afternoon and evening a general chase with the gorilla as the objective was conducted by the residents of Idaville and vicinity. The animal described by some as a gorilla and by others as a kangaroo was first seen at Snyder's hill between York Springs and Idaville where a number of men failed in a combined attempt to capture or shoot it. At 10 o'clock Thursday night about fifty men gathered on Pike hill near Idaville and again vainly tried to kill the elusive creature which escaped across the snow to Daniels' hill near the Adams-Cumberland line.

"The theory advanced for the animal is that it escaped from a circus train during a railroad wreck several months ago.

"So far no damage by the animal has been done excepting the robbery of a smoke house attributed to it."

From: Waynesboro, PA, *Press*
January 22, 1921: p. 1.

Sunnyside Party Needs Commission

That escaped circus gorilla of which so much has been published lately seems to have the quality of ubiquity: it is here, there and every place. All one has to do is shut his eyes and think gorilla and the monster will be silhouetted on the brain and be seen prowling about smokehouses.

His most recent apparition is reported today at Sunnyside. Of course, no one saw the man-eating monster, but some one had gorilla dementia and it was just the same as the real thing.

From: Waynesboro, PA, *Press*
January 24, 1921: p. 1.

Car Barn Worker Chased by Gorilla

Harry Shindledecker, Chestnut street, employed with the C. G. & W. St. Ry. Co., while on his way to work this morning, arrived at the car barn, it is said, in a very excited condition.

The cause for his perturbation of mind, he said, was an object passing in front of him at the E.-B. baseball grounds that had the "ear marks" of being the gorilla that is running at large and is much feared and sought after by many persons.

Mr. Shindledecker said the animal was about his height and ran in a westerly direction.

From: Waynesboro, PA, *Press*
January 26, 1921: p. 1.

Gorilla has Rouzerville in Complete Upset

Big Armed Posse Gives Chase

That escaped circus gorilla, whose peripatetic performance in the mountainous regions of Franklin and neighboring counties has been an exciting topic in many sections, where scores of people have given him chase or tried to snipe him in the neighborhood of barns and houses, has now invaded the west slopes of the Blue Ridge and the whole neighborhood herearound is in turmoil.

As told by this paper yesterday, the big ape from South Africa was seen in the E.-B. ball park early yesterday morning by Harry Shindledecker, who was on his way from home to the trolley car barn. It was related that the black monster crossed right in front of Mr. Shindledecker. As the story has not been contradicted it stands as told.

And now the excitement is transferred to Rouzerville and the mountain range to the east. Not

since Lee's battered and disorganized legions came thundering down the mountain after the Battle of Gettysburg, hotly pursued by Kilpatrick's cavalry has there been heard so much gunfire as there was about the mountain village last night.

The grisly ingeena was discovered soon after nightfall in the yard of "Shinny" Needy by his brother, Henry Needy, who was passing along one of the back streets. The animal was crouched in a heap inside the fence. Henry took it at first to be a dog, but when he called to it the animal gave a gurgling bleat, such as he had never heard before. Convinced that it was some sort of wild animal young Needy picked up a rock and whaled it at the uncanny beast. The latter, however was too quick for the missile and gathering itself up on all fours bounded away and was soon lost in the bushes along the mountain edge.

Needy reported his find and then "Bid" Whitmore and "Pinty" Naugle were fired with the spirit of the chase. They got their trusty rifles and made for the bushes where the big ape was last seen. They kept up the hunt all along the slope and finally succeeded in flushing the big chimpanzee in Mike Lookabaugh's field at the foot of the mountain spur. They shot, reloaded, shot again and kept it up as long as they could see a hair of the rapidly retreating animal. Again it had made its escape to the bushes, its first line of defense.

Then a more determined and elaborate campaign was decided on. The whole town was in an uproar at the fierce gunplay heard among the surrounding hills and fields and the news quickly went from door to door that "the gorilla" had come to town. Members of the deer club and other marksmen, to the number of a score and more were quickly mobilized and on their way to the battle front. They formed a long circle around the foothill where the animal was last seen and in this formation moved

into the woodland. They scoured the mountain slope half way to Pen-Mar but couldn't raise the quarry. Meantime some of the gunners saw black dogs along the slopes and mistaking them for the gorilla shot them.

Town in Panic

By this time the town was in a veritable panic. Scores of people looking out of their windows were sure they saw the crouching monster in their yards. John Monigan was dead sure he had seen it run past his house. It was after this that Whitmore and Naugle shot at it in Lookabaugh's field.

It was something awful. Young ladies and women who happened to be abroad sought refuge in the first house they came to. The result was that they were afraid to go home alone and had to be provided with escorts. The latter were in demand, and even married men well up in years were pressed into service. It was a night of terror and it was long after midnight before the village had settled down and been wrapped in slumber.

Seen at Monterey

Plausibility is added to the report of the appearance of the strange animal at and near Rouzerville by the fact that later in the evening the gorilla was seen by two young men, William Flohr and Maurice Molesworth, of Blue Ridge. They were returning late from a party and as they neared the golf links at Monterey they saw what they thought was a man approaching them on all fours. Thinking it was a sneak thief they stopped and called to him, asking him what he was doing there. The animal came toward them slowly and then rising and coming forward made some gurgling sounds which were not human according to the young men. Then they beat it, not having their guns along.

The animal was about five feet in height and that is all the young men can describe about him, as they were so frightened they did not stop for further investigation.

The young men were in high state of excitement.

Frank Goetz Saw Him

Further proof that it is a really truly escaped gorilla is afforded by Frank Goetz, of Rouzerville, who swears—or is willing to—that he saw him in the bushes back of his house on Tuesday night.

From: Waynesboro, PA, *Press*
January 27, 1921: pp. 1, 6.

Chase Gorilla to Mountains

Posse of Rouzerville Citizens Make Futile Attempt
to Kill Animal—Village was in Uproar
Marksmen Form Line of Attack but
Gorilla Makes Escape.
Was Seen at Monterey Golf Links.

"Gorilla" warfare which was started last week in the vicinity of Idaville, when Adams county residents, well armed, pursued what is believed to be an animal that escaped from a circus car when it was wrecked, not long ago, was renewed by citizens of Rouzerville Wednesday night when an armed posse scoured the Blue Ridge slopes in the hope of getting a shot at the beast.

The animal was discovered in an alley just as dusk was falling in the village. The word was quickly spread and the members of the Rouzerville deer camp and every one else that had a rifle soon turned out for the hunt. After the mobilization of marksmen was completed, the attackers in battle formation started up the mountain.

Gorilla Chased Out

They had barely gotten underway when the animal was chased out. Although a number of shots were fired the chimpanzee kept on bounding toward the thicker brush of the slope. It was then that an elaborate campaign was decided on and a messenger was sent for reinforcements. The firing on the mountain was heard in the village and the town was soon in an uproar. It was decided to form a great circle around the foothill where the animal was last seen. Deployed in this fashion the grizzled hunters and young marksmen moved into the woodland.

Dog Pays Penalty

They scoured the mountain slope half way to Pen Mar but found no trace of the gorilla. A black dog running through the underbrush paid the death penalty when an excited hunter mistook it for the ape.

When the hunters returned from the mountains, reports say, the town was in a turmoil—the animal had been seen there while the hunt was on. Young women who happened to be on the streets when the "panic" started were afraid to go home and escorts had to be provided.

Since the Rouzerville affair, the gorilla was seen at Monterey by two young men who were on their way home from a party. As they neared the Monterey golf links, they saw what they thought was a man approaching on all fours. When they called the animal rose on its hind legs and came toward them making gurgling sounds. The young men did not investigate any further.

From: Gettysburg, PA, *Times*
January 28, 1921: p. 1.

Gorilla is Only a Matter of Moonshine

Farmer John A. Johnston was in town today on a business errand. Asked if any more gorillas had been seen about Rouzerville since Wednesday night he replied that it all depended on whether the right kind of "moonshine" had been taken. He explained by saying that the old-fashioned stuff made people see snakes, but the kind people are making now makes them see gorillas.

From: Waynesboro, PA, *Press*
January 28, 1921: p. 1.

Gorilla Was Brot to Rouzerville for a Purpose

The war on the gorilla at Rouzerville was not renewed last night as expected. A lot of the crack shots had laid in a fresh supply of ammunition and were fixed for our African kinsman, but as scouts sent out in the early part of the evening reported no traces of the rover the offensive planned for the evening was not launched.

The fact that the animal after being chased into the foothills east of Rouzerville by the firing squads the night before and had been seen towards midnight at Monterey, led to the belief that the "varmint" had passed on over into Adams county again, whence he came.

Gorilla Was Imported

All was comparatively quiet at the mountain city and young ladies felt free to go and come, and without escorts, if none were to be had—and that is another story, for it is said there is no lack of Beau Brummels in that balliwick. In fact it is hinted that certain reform interests, who look with dismay upon the growing

tendency of young ladies to be too much on the streets of nights, imported the gorilla for the very purpose of breaking the practice up. If this report be true, it may be expected that the gorilla will be kept within calling distance ready to spring on the town any minute.

This being the case, it would be the part of prudence for the fair denizens to take "dad" or "big brother" along when going out at night.

Scared Up in the Corner

The scare spread to Glen Furney yesterday and people quaked in their boots. The women folks were afraid to go to bed and couldn't sleep when they did. The least little rustle in the bushes they imagined was the gorilla and whenever a dog barked they were sure the beast was about. Men slept with their rifles standing at the head of the bed, says reports from that section. A woman from "the Corner," having a date in town that required her to leave home at 6:30 to catch the 7:50 car at Hess' lime kiln said she carried a big rock in her hand the whole way, also some extra hat pins.

The scare was due in part to the Rouzerville excitement of the night before and was given fresh impetus by the report that Paul Gonder had encountered the black monster last evening as he was returning from Black's Gap with a load of lapwood. The report was that it had crossed the road only a hundred yards ahead of him and so frightened him that he broke a trace cutting down a side road to reach home.

From: Waynesboro, PA, *Press*

January 28, 1921: pp. 1, 6.

Saw Gorilla in Daylight

Animal has Haunt in Mountain, According to Reports

The big gorilla, which has been wandering in the mountains of southern Pennsylvania for some weeks, has turned up again near Pen Mar, according to reports from that section.

The big ape was seen by John Simmons, who resides between Pen Mar and Rouzerville, Saturday afternoon, while the light of the sun was so bright it could leave no doubt upon the mind or vision. Simmons was going through a field near his home, when he saw a strange, unlikely object, which he at once connected with the "gorilla," from descriptions he had read in the newspapers.

At the time he saw the strange animal, Simmons was not armed and he was not in the mood to enter combat with the gorilla.

From: Gettysburg, PA, *Times*
February 1, 1921: p. 1.

Posse of 25 Chases Escaped Gorilla

Waynesboro, Pa.—Franklin county's phantom gorilla has invaded the west slopes of the Blue Ridge, and the whole neighborhood is in a turmoil.

Wednesday night a strange animal, at first thought to be a huge black dog, was seen crouching along a fence at Rouzerville. When called to the animal gave only a gurgling bleat. Recalling that the famous circus fugitive had been seen at Waynesboro in the early morning, the man who met the beast raised the alarm in the community.

A posse of twenty-five leading rifle shots was quickly in pursuit of the animal, and members say they managed to get a number of shots at it, as it

scampered into the foot hills, where the trail was lost.

From: Snyder County *Weekly Herald*
February 2, 1921: p. 1.

Excited Over Gorilla Tales, Shoots Neighbor's Mule

Abraham Lau, of Franklintown, York county, had been reading the papers and saw that a gorilla had escaped from a circus in the northern part of the state some time ago and was supposed to be at large yet. The story worked up a good deal of excitement in the various parts of York county, and from time to time reports came that the gorilla had been seen. It remained for Lau, however, to really have an adventure, for when he went outside the house in the dark for a shuttle of coal he saw what he supposed was the gorilla and he hurried into the house for his trusty gun. Then he stole out and fired point blank the "gorilla" and was surprised to find that he had shot his neighbor's mule, which had strolled near the Lau home.

From: Snyder County *Weekly Herald*
February 9, 1921: p. 1.

Motorists See Gorilla on Jack's Mountain

Harvey Minnich, East Main street, and Frank Rodgers, Keystone Garage, motored to York yesterday. On their return trip across Jack's mountain they met a strange looking animal, presumably a gorilla. The young men were very much frightened but continued on their way home.

Luckily the jungle monster did not show any

fight, but at the approach of the car scampered off down into the underbrush and was lost to view. They say if they'd had their guns with them they'd have given chase, but this is highly problematic and would not pass current with their friends without some affidavits.

From: Waynesboro, PA, *Press*
February 10, 1921: p. 1.

In most cases, reports like these just fade away, with no conclusive evidence having been found. This particular flap ends with, supposedly, a bit more. Note that Queene Anne's county is in Maryland, nowhere near the central Pennsylvania counties previously mentioned.

Gorilla Met Fate; Choked to Death by Maryl'd Farmer

The famous gorilla that terrorized all Rouzerville and the Blue Ridge and sections of Adams county a couple weeks ago, has finally met the fate that befalls all beasts of prey when they venture too far. The jungle monster, supposed to have escaped from a circus some time ago and made a tour of several of the southern counties of Pennsylvania was finally run down and killed in Queen Anne's county, Md. The following is the report from Centerville, Md., today:

Choked Him to Death

Locked in a death struggle with a ferocious "gorilla" which for several days had terrorized the colored population of the willoughby neighborhood, Queen Anne's county, Wm. B. Quimby, a prosperous farmer who resides on the Walnut Ridge farm in the

Sixth District, choked the creature into insensibility and then kicked him to death.

Rumors of the appearance of the "gorilla" in the neighborhood were last heard the latter part of last week, several negroes told miraculous stories of escapes. Finally some fox hunters saw the animal last Saturday afternoon. The "gorilla" made its appearance at Walnut Ridge farm, Mr. Quimby sighted him from a distance and started in pursuit with the result already mentioned.

Known Here

Mr. Quimby is known to a number of local Eastern Shore folks and is a near relative of Roland Q. Tarbutton, one of the foremen in the Landis Machine Co., whose former home was in Talbot county, adjoining Queen Anne's.

Our neighboring people will now rest easier knowing that no more will their lives be threatened by the voracious beast.

From: Waynesboro, PA, *Press*

February 21, 1921: pp. 1, 6.

This, of course, leads to the question, "What happened to the body?" If the event actually occurred, one would imagine that such a beast would end up in a museum, or that at least a full description of it would be in the local newspaper. Unfortunately, the issues I searched through in a Maryland library were spotty, and any such description might have been in one of several missing issues. Still, one article did come up which proves enlightening.

Weird "Ghost" Story

Some housekeepers of the town of Cambridge, who have their own dishes to wash after supper

while their colored help go serenely home before dark, are blaming their troubles on a "ghost" that is frequenting the Park Lane section of the colored district.

The story is that the "ghost" appears sometimes as a goat and sometimes as a kangaroo; that it is visible but intangible; that people have shot at it point-blank without killing it; that men have come so close to it they could put their arms around its neck only to find it vanish from their grasp and sight.

The less imaginative of the colored people on Park Lane and the avenues adjacent maintain that there is no "ghost," but a man, who, they aver, has thrown bricks at some of the women living in that section.

From: Centreville, MD, *Record*
February 12, 1921: p. 2.

In other words, Queen Anne's county, Maryland, had its own unusual animal sightings, and the Waynesboro editor incorporated it into the south-central Pennsylvania legend. Certainly, the "gorilla" did not travel from central Pennsylvania to Queen Anne's county in a matter of days.

The central Pennsylvania "gorilla" flap is comparable to modern Bigfoot flaps—especially to the extensive flaps from Harford and Baltimore counties, Maryland, in the late 1970s and early 1980s. Misidentifications, jokes, and leaps to both skepticism and paranormalism played their part then, just as they do today. Such sightings do not prove that a large primate exists in North America, but they may help as we seek to understand patterns in sightings over long periods of time. Note, for example, that the Pennsylvania sightings were a shock to the residents—indicating that whatever the animal was, it was not commonplace at that time. If we assume for a minute that Bigfoot exists, and that it may exist in Pennsylvania, what would that say about its population at that time? Obviously, it would not have been a large population,

and such sightings could have been based on a single wandering male coming from western Pennsylvania or from New York.

At this point, the only story which suggests the possibility of specific hard evidence is the Queen Anne's county case. If an animal was killed there, it should have been reported in a local newspaper or presented to a local museum. Based on the earlier Maryland newspaper account, the animal may not have been prior to death—I doubt that even a burly farmer could choke a large ape to death.

It might also be feasible to backtrack newspapers from the first account, to determine whether other sightings were published in newspapers to the north in the months prior to December, 1920. I suspect that other cases of "gorillas" will be found from the early 1900s if investigators are willing to spend some time looking through the appropriate historical archives.

CHAPTER FOURTEEN

The Great Naked Bear

There the wrinkled old Nokomis
Nursed the little Hiawatha,
Rocked him in his linden cradle,
Bedded soft in moss and rushes,
Safely bound with reindeer sinews;
Stilled his fretful wail by saying,
“Hush! the Naked Bear will hear thee!”
Lulled him into slumber, singing,
“Ewa-yea! my little owlet!
Who is this, that lights the wigwam?
With his great eyes lights the wigwam?
Ewa-yea! my little owlet!”

—*The Song of Hiawatha*,
Henry Wadsworth Longfellow (1855)

While it may not always have direct bearing on currently extant species, historical investigations can unearth phenomenal tales about strange creatures. As usual, we cannot assume that all such tales are based on biological species, and of those which might be, we cannot assume that they are accurate in all parts. Still, the compilation of historical anecdotes may prove useful should we, in the future, possess hard evidence that humans did encounter such beasts.

Here are two published descriptions by , John Heckewelder (1797; 1805), a Moravian missionary who also studied Native American cultures in the late 1700s and early 1800s.

**A Letter from Mr. John Heckewelder to
Benjamin Smith Barton, M. D. containing an
Account of an Animal called the Big Naked Bear.**

Read March 10, 1797.

Dear Sir, I have now to communicate to you, what came to my knowledge respecting an animal, which the Mohican Indians called Ahamagachktiât Mecehquá, and the Delawares (if I recollect right) Amangachktiât. The Big Naked Bear. Their reports run thus: That among all animals that had been formerly in this country, this was the most ferocious. That it was much larger, than the largest of the common bears, and remarkably long-bodied: all over (except a spot of hair on its back of a white colour,) naked. That it attacked and devoured man and beast, and that a man, or a common bear, only served for one meal to one of these animals. That with its teeth it could crack the strongest bones. That it could not see very well, but in discovering its prey by scent, it exceeded all other animals. That it pursued its prey with unremitting ravenousness, and that there was no other way of escaping, but by taking to a river, and either swimming down the same, or saving one's self by means of a canoe. That its heart being remarkably small, it could seldom be killed with the arrow. That the surest way of destroying him was to break his back-bone. That when a party went out to destroy this animal, they first took leave of their friends and relations at home, considering themselves as going on an expedition, perhaps never to return again. That when out, they sought for his track, carefully attending to the course the wind blew, and endeavoring to keep as near as possible to a river. That every man of the party knew at what part of the body he was to take his aim. That some were to strike at the back-bone, some at the head, and others at the heart. That the last of these animals known

of, was on the east side of the Mohicanni Sipu, (Hudson's River) where, after devouring several Indians that were tilling their ground, a resolute party, well provided with bows and arrows, &c. fell upon the following plan, in which they also succeeded, viz. knowing of a large high rock, perpendicular on all sides, and level on the top, in the neighbourhood of where the naked bear kept, they made ladders, (Indian ladders) and placing these at the rock, they reconnoitred the ground around, and soon finding a fresh track of the animal, they hastily returned, getting on the top of the rock, and drawing the ladders up after them. They then set up a cry, similar to that of a child, whereupon this animal made its way thither, and attempted to climb the rock, the Indians pouring down their arrows in different directions, all the while upon him. The animal now grew very much enraged, biting with its teeth against the rock, and attempting to tear it with its claws, until at length they had conquered it.

The history of this animal used to be a subject of conversation among the Indians, especially when in the woods a hunting. I have also heard them say to their children when crying: 'Hush! the naked bear will hear you, be upon you, and devour you.' From the nature of their conversation on this subject, I was led to believe the story had foundation. Old Indians whom I questioned on this matter assured me it was fact, relying on the authenticity of their forefathers' relations. Further reports respecting this animal have in part slipped my memory, wherefore I omit making any mention of the same.

The panther is not considered by the Indians as *such* a ravenous animal, as by the white people he is reported to be. I know but of one instance, where an Indian was nigh being attacked by one of them, but this was owing to the Indian's approaching his den. The Indian however found means of killing

him, and taking the young, which he brought down to Philadelphia, which was about the year 1770. This animal, the Indians say, lives chiefly on deer, which it either by slyness catches itself, pursues after they have been crippled by the hunters, or takes from the wolves after they have caught them.

If hereafter, I shall have an opportunity of getting further information respecting the naked bear; I will freely communicate the same to you.

Believe me to be, Dear Sir,

Your truly affectionate friend, &c.

John Heckewelder.

Indian Account of a remarkably strong and ferocious Beast, which (they say) existed in the northern parts of the State of New-York, about two hundred years ago.

Collected, and communicated to the Editor,
by Mr. John Heckewelder.

The Jagisho (or naked animal, or Bear, as some of the Indians call it) was an animal much superior in size, to the largest bear. It was remarkably long-bodied, broad- down its shoulders, but thin, or narrow, at its hind legs, or just at the termination of the body. It had a large head, and frightful look. Its legs were short and thick. Its paws (the toes of which were furnished with long nails, or claws, nearly as long as an Indian's finger) spread very wide. Except the head, the neck, and the hinder part of its legs, in all which places the hair was very long, the Jagisho was almost naked of hair, on which account the Indians gave it the name of "Naked."

Several of these animals had, before this time, been destroyed by the Indians, but this particular one had, from time to time, destroyed many of the

Indians, particularly women and children, when they were out in the woods, getting nuts, digging roots, &c., or when they were working in the fields. Hunters when fast pursued by this animal, had no means of escaping from it, except where a river or lake was at hand. By plunging into the waters, and swimming out, or down the stream, to a great distance, they effected their escape. When this was the case, and the beast was not able to pursue his intended prey any further, he would set up such a roaring noise, that every Indian who heard it trembled, with fear.

This animal preyed upon every beast it could lay hold of. It would catch and kill the largest bear, and devour it. While the bears were plentiful, the Indians had not so much cause to dread the Jagisho: but when this was not the case, he would run about in the woods, searching for the track, or scent, of the hunters, and follow them up. The women became so much afraid of going out to work, that the men assembled to deliberate on a plan for killing him.

This beast had its residence at, or near, a lake, from which the water flows in two different ways (or has two different outlets), one northerly, and the other southerly. The Indians being well informed of this circumstance, a resolute party of them, well armed, with bows, arrows, and spears, made towards the lake. They stationed themselves on a high, perpendicular rock, climbing up the same by means of Indian ladders, and then drawing these ladders up after them.

After being well fixed, and having taken up with them a number of stones, the Indians began to imitate the voices and cries of the various beasts of the woods, and even those of children, in order to decoy the Jagisho thither. Having spent some days in this place, without success, a detached party took an excursion to some distance from the rock. Before they had reached the rock again, the beast had gotten the scent of them, and was in full pursuit of them.

They, however, regained that position, before he arrived. When he came to the rock, he was in great anger, sprang against it with his mouth wide open, grinning, and seizing upon it, as though he would tear it to pieces. During all this time, numbers of arrows and stones were discharged at him, until, at length, he dropped down, and expired.

His head was then cut off, and was carried, in triumph, by the Indians, to their villages, or settlements, on the North-River, and was there fixed upon a pole, that it might be seen. As the report of the death of the animal spread among the neighbouring tribes, numbers of them came to view the head, and to praise the victorious Indians, for their warlike deed.

N. B. The Mahicanni claim the honour of this act.

Heckewelder remarked concerning these tales, "The preceding traditional accounts of the Indians, concerning the 'Naked Beast,' are, in some respects, so very extravagant, that they may, perhaps, be deemed altogether unworthy of any attention. I must confess, however, that I cannot but consider such traditions, though imperfectly handed down to us, and evidently disfigured by fable, as entitled to the notice of the naturalist, and philosopher." He suggested that while the *Jagisho*, as described, may never have existed, the Native traditions do suggest that "some remarkable animal" was responsible for them.

Tales of the "great naked bear," sometimes called the "stiff-legged bear," are found in several eastern Native American groups, and had been suggested as possible residual folklore of mastodon sightings before they became extinct—this, of course, leading to a debate over the ursine vs. pachyderm characteristics of the folkloric creature (Siebert 1937). Siebert pointed out that the creature shares a transformation myth with Windigo or cannibal giants. He quotes a Penobscot informant—"The Penobscot belief was that when a common black bear had once eaten human flesh,

the bear's hair or fur would fall out entirely, and the bear would become naked and hairless. Once having tasted human flesh, the bear henceforth became dangerous and would attack other human beings. At this time the bear became the possessor of magic or supernatural power, so that he could charm and subdue those who chanced to meet him in the woods."

This giant ursine was generally described as aggressive, hairless except for a few tufts on its back or tail, long-bodied or larger than the common black bear, and in some cases, amphibious. At present, there is no justification for trying to wrangle in Pleistocene species, like the short-faced bear, *Arctodus simus*, as a possible explanation. While it may match the folkloric characters, as a large-bodied highly carnivorous ursine (Matheus 1995), one might just as well argue for wandering polar bears. After all, couldn't the hairlessness be an inaccurately transmitted observation of a white bear?

Actually, the *hairless bear* stories could just as easily have come from observations of diseased bears. Mange is responsible for the balding bears of Ocala National Forest in Florida (Roig-Franzia 2002). Some bears lose only the hair on their face or rump, while others lose it altogether. There do not appear to be any additional health problems, but the bears certainly look strange.

CHAPTER FIFTEEN

Stone Giants

The Stone Giants, or Cannibal Giants, are a common mythical figure with certain Native American groups. Because of their human-like, albeit oversized, stature, they have been drawn into the mass of folktales which some enthusiasts believe may have been influenced by Bigfoot sightings. What I am going to suggest is that these stories, whether based on an unknown biological species or not, have little to do with Bigfoot.

One of the earliest published tales of these mythical creatures comes from the Buffalo, NY, *Morning Express* of August 2, 1870 (kindly forwarded by investigator Todd Jurasek):

Legend of the Stone Giants

A Singular Tradition Among the Onondaga Indians.

[From Our Own Correspondent.]

Gowanda, July 30, 1870.

It is a curious story that I am about to relate. One that is peculiarly interesting, because there are a large number of individuals now living who place implicit faith in its truth. It is the legend of the Stone Giants, and the Onondaga Indians look upon it as a matter of great historical importance. During a recent visit to the Cattaraugus Reservation settlement, in this vicinity, I chanced to make the acquaintance of a little old Indian, a member of the Onondaga tribe, and, it is said, one of the oldest aboriginal specimens in the State. He claims to be over an hundred years

old, and his looks certainly do not belie his assertion. But to the story. After talking with this venerable red man for a while, half in earnest, half in jest, I asked him if he knew anything about the Cardiff Giant that was dug up in Onondaga County. Imagine my surprise when the old man replied, "know all about 'im; a lot more there, too." By dint of persistent questioning and close attention, I obtained the facts of the following story, which I relate substantially as he told it to me, merely substituting plain English for his Anglo-Indian tongue.

"Many, a big many, moons ago the Onondagas had their hunting grounds in the middle of the State, where now lie the towns and villages of the white man. The wigwams of that tribe then covered the spot now called Syracuse, and the young Onondaga braves used to hunt their game and enjoy their sports in the wild woodlands that have since been leveled into farms and pastures by the white man's hand. The Onondagas were free and happy then until the Stone Men from the North came to destroy them. The Stone Men were a small but powerful race of giants, who, as the story runs, occupied their time in warring with the various tribes of Indians and capturing and eating all human beings that they could lay their hands on. The Northern Giants were not flesh and blood mortals, but were constructed entirely of stone—body, arms, legs, head and all, were of the same hard substance, and they carried large clubs and spears of jagged stone, with which, it is said, they slew dozens of victims at one blow. Against these monsters resistance was of no avail, and ill-fated was the tribe upon whose camp they moved. It was no wonder, then, that the members of all tribes were afraid, and ran in terror at their approach. It was a dark, cold night in the wintry part of the year, when the alarm was brought to the Onondaga camp. One of the squaws had been out

hunting deer, and she had seen the stone men coming from afar. She had heard the heavy tramp of their feet and their harsh, rumbling voices in angry exclamation. They were coming straight toward the camp. Then there was fear and dread among the Onondaga. Everything was thrown into the wildest confusion. The wigwams were deserted, the untasted suppers left to burn in the smouldering camp fires, and men and squaws, with their papooses in their arms struck off in all haste for the woods. But they did not go far. As they were fleeing pell mell across the country a sudden spell all at once seized upon them and held them back. A thick black cloud arose about them and in their terror they prostrated themselves upon the ground. A heavy noise and a clap of thunder was heard and then a figure about the size of one of their own chiefs, all dressed in black, appeared in their midst. It had no weapons nor blankets, nothing but a little black stick in its hand. This, the newcomer waved over his head three times and then said to the cowering Onondagas, "Have no fear. I will deliver you from the Stone Men." For several hours they awaited the approach of the fearful giants. At last the tramp of their heavy feet was heard nearer and nearer, and again the terrified Onondagas attempted to run, but the same unaccountable spell held them back, and the "man in black" as he saw their fears bade them to dispel their anxiety, for he would protect them. The Stone Giants came in sight. They saw the trembling Onondagas, and with a loud yell, started towards them and in another instant would have annihilated the tribe, but for a mystic wave of his wand, the stranger caused the earth to open where the Stone Men stood and in an instant they sank out of sight. The edges of the chasm gradually closed together, leaving the ground as it was before. The astonished and awe-stricken Indians then turned to thank their

deliverer, but he had disappeared. They went back to their camp, and never after that received molestation from the Stone Men."

The story may appear strange and bordering on the ridiculous, but it has been handed down from generation to generation of the Onondaga and they earnestly believe the tradition, and moreover, they have no doubt but what the Cardiff Giant was one of these veritable "Stone Men."

Rambler.

This folk tale is just one of many involving Stone Giants. Most are generic—even this one is not unique, as I have seen the same story plot, with only minor differences, from a South American tribe. Some stories (Leland 1884) may be elegant narratives of redemption from a cannibal past, while others (Barbeau 1914) are straight-forward "ghost stories" for frightening children. What are of interest to us are the general characteristics described in such myths—large man-like creatures, associated with the North or Winter, sometimes with caves, often dark-skinned, often with facial distortions (*e.g.*, no lips), and with a hard, flinty skin.

Most of these stories are lumped into the "could be Bigfoot" files (*e.g.*, Pecher 1979). A few investigators differentiate reports by aggression, or purported heights, but I have yet to see anyone distinguish reports by the most obvious characteristic—the *stony* skin. After all, primates are hairy, right?

Coleman and Hall (1970) noted, for example, a Witiko legend recounted by the Rev. Joseph E. Guinard—"The witiko wore no clothes. Summer and winter he went naked and never suffered cold. His skin was black like that of a negro. He used to rub himself, like the animals, against fir, spruce, and other resinous trees. When he was thus covered with gum or resin, he would go and roll in the sand, so that one would have thought that, after many operations of this kind, he was made of stone." Could this tradition have been based on early observations of unusual Bigfoot behavior, transforming a hairy pelage into a stony coat?

This is where we should recall Colarusso's (1983) counsel to

detect mystical elements in folk tales, and recognize that they usually have no physical basis. Rev. Guinard's tale is a "just so" story, as the Native American folk-tellers explain a particular folk belief [*that the witiko had stone-like skin*] from their perspective. After all, we should never posit that Native Americans were unable to think for themselves or would not try to determine a rational basis for their own assumptions. Is there any evidence that this is a "just so" story? Siebert (1937) supplied a clearly analogous myth with the Great Naked Bear—"Sometimes a bear will crawl out of his den in the winter and will roll himself in the snow, which freezes to a hard crust. Then he will go ravaging the country fiercely in search of food. Such a bear was dangerous because arrows could not pierce the ice crust which covered him." I have no doubt that a careful search through Native American folktales will uncover similar transformation mechanisms among mythical creatures.

So, what am I arguing? At present, I'm not arguing anything—just pointing out that there really aren't any Stone Giant folk tales involving hairy bipeds—*dark skin* is not clearly equivalent to *hairy skin*. But, while I'm here, let me point to a few non-Native American anecdotes involving hairless giant primate-like creatures.

The first such report comes from Maryland (Browning 1947):

The Ghost of "Spook Hollow"

R. Getty Browning

Many years ago when Meshach Browning and his family lived at Sang Run, a frolic or party was to be held at one of the neighbor's homes near Accident, and among those invited were William Browning, John L. Browning and their sister, Jane. It was intended that the young people would stay all night after the party and that the next day the boys would go hunting, consequently William took his rifle along. They

* Spook Hollow is on the John F. Friend farm at Sang Run. The entrance to "Old" John Friend's Salt Petre Cave is nearby.

left their home late in the afternoon, William riding one horse, Jane another and John L. walking, the arrangement being that the boys would ride turn about, and the one who rode would carry the rifle, as they were not expecting to see any game along the road. Their path led across "Spook Hollow," a place situated near their home, and where a number of strange things had been seen by various persons. Up to that time the Brownings had never seen anything out of the ordinary at this place or anywhere else for that matter, and they were not people to be unduly excited by any strange event.

William and John L., sons of Meshach Browning, the famous hunter, had participated with him in many bear fights, and were noted for their coolness, courage and levelheadedness; therefore, it is all the more singular that they, on this occasion, saw something which they never clearly understood. They reached "Spook Hollow" a little after sundown, and it was John L.'s turn to walk. He was perhaps 20 yards ahead of the horses when he suddenly saw some horrible monster standing a few feet off the trail. He never saw anything like it before, and as he described it, it appeared to be about the size of a yearling bear, which would be as tall as a good size collie but much heavier.

This beast, however, appeared to be devoid of hair, having a skin like elephant or a toad, and instead of having a head such as a bear or any other animal known to them, it seemed to have a human face set right into the base of its neck or rather directly in the shoulders. It was standing on a small hickory pole which had fallen; it made no move to advance or retreat, and it made no sound. John L. had seen many a wild cat, panther and bear, but here was something entirely different. He called to William, "Bring the gun, Bill, here's the devil and I want to shoot him." William and Jane rode up beside John L.

and they too had a good look at the beast; although John L. insisted that William give him the gun so that he could shoot it, William thought that it was such an unusual creature that it was better not to molest it. Therefore, he told John L. to come along and not bother it. This could not possibly have been a matter of imagination since they all saw it; the horses did too, because as long as those horses were used on that trail, they recognized this spot and showed signs of nervousness and fright whenever they passed it.

The question is: "What was this apparition?" The writer when quite young had an opportunity to talk to John L. about this occurrence; he stated that he felt sure that it the devil that they saw. He described the appearance of the animal just I have given it. William, however, evidently thought that whatever they saw, it was beyond anything in nature and he did not like to talk about it too much, although he corroborated the description given above.

Notice that while the creature in question never exhibited "paranormal" tendencies, it was immediately characterized as an apparition or ghost. This is common when a creature shares no obvious similarities to known species, or shares perhaps too much of a similarity to humans. It is unfortunate that the description of this particular animal is so vague. No specific posture is given, so we don't know if the animal was standing upright or crouching. The elephant- or toad-like skin is interesting, suggesting a rough texture rather than just being hairless.

The second case of interest, located by author Patty A. Wilson, comes from a collection of ghost stories by Elliott O'Donnell (1964). In 1894, O'Donnell heard the story of a strange "ghost" that was seen in the Grenburg Valley, on the eastern shore of the Hudson River, New York. The story involves travelers who encounter a tall creature walking the road, "gigantic, ten or twelve feet in height it seemed. It was nude, its skin being seemingly a glistening,

uniform grey, and its face like that of a death's head..." Associated with the creature were strange calls—"whoopings, interspersed with harsh, discordant cries and queer, hollow-sounding, long-reverberating laughter." O'Donnell, a specialist in ghost stories and the like, emphasized the unearthly in this particular folktale. Still, if these were the only stories of such a creature, it would be simple to dismiss them as fiction.

What especially intrigues me is a modern day account of such an animal. Wilson's interest in these gray creatures comes from her interviews with a family she lived with for a period of time in Blair County, Pennsylvania. The family lived in a small house at the end of Ridge Road, which connects Oreminea to Williamsburg. Ridge Road is exactly that—a small road, mostly unpaved, some three or four miles in length, that follows a densely wooded ridge.

One year, the day after Thanksgiving, the father decided to go hunting on the ridge. By dusk, he had found no deer, and started walking home on the road. Noticing a tall figure ahead of him, he hurried forward, thinking to catch up with it. As he got closer, he realized that the figure was not human—"The creature stood at least a head taller than a man and was a ghastly gray color. It was completely naked and seemed to have no fur. The arms were disproportionally long, giving it a primate look" (Wilson 1998). Frightened, the man carefully followed the creature until it moved off the road and disappeared into a sink hole. When he got home, he was shaking with fright, and refused to tell his wife the story for several days. After that experience, he refused to allow his children to walk the road along the ridge. It was years before they had any corroboration of this creature, but one evening, their teen-age son went out to feed and water their dogs. Noticing movement in the woods at the edge of the pole light's reach, he stopped to watch what he thought would be a deer. Suddenly, he realized that he was seeing a large gray human-like creature—"Its face looked like a skull over which gray skin was drawn. He saw no hair on it, but it had eyes that bore into him—red, glowing eyes that reflected the pole light" (Wilson 1998). It turned away and disappeared into the woods, leaving behind a frantic and scared teen-ager.

Today, Wilson noted (pers. comm.), the family is gone, but she believes the family did see something unusual. She was first told the teen-ager's story 25-30 years ago: "I can only tell you that he was a macho boy who liked to impress the girls, but when I wanted to walk the Ridge Road one evening he turned white. It took a lot of prodding to get the story out of him, but I finally did. Later, I got his folks to tell me the story because I thought that the boy was pulling my leg." She pointed out, "These people were country folks and normally would have taken a gun and gone outside to see who was 'poking around' on their ground. When the dogs began their pacing and screaming and pulling the length of their chains, the family shut the doors and locked them. They closed the curtains, got a gun loaded and waited. You could see and feel the fear in that house, and I have to admit that I got frightened just because they were so terribly upset. They were very poor folks who could not afford to move and that was why they stayed there so long. Were they lying to scare me? I really don't think so."

So, we have the glimmering of a cryptid profile for the Stone Giant—a tall, dark-colored, hairless primate. While Native American folklore of such may be wide-ranging, actual sightings center within the Appalachian Mountain region. While the earliest sightings are from the 1800s, the accounts from central Pennsylvania appear to be as recent as the 1960s or 1970s.

Let me state for the record that the Cannibal Giants, Stone Giants, Chenoo, etc., share the mythical foundations of Wendigo psychoses and straight myth-making—possibly old traditions of wandering Vikings. And, I'll admit to a mild distaste for tossing out yet another primate cryptid for North America. But, again, cryptids are classifications of observed phenomena, not tangible in and of themselves. If a single biological species, known or unknown, is found to be responsible for all North American mystery ape sightings, all well and good. But let's not force clearly distinctive ethnoknown creatures into the same folk species just because they disturb us.

I would personally like to spend some time along the Ridge Road. I have driven this road, and can vouch for its secluded nature. Wilson pointed out to me that there are numerous sink

holes and abandoned mine shafts along the ridge which might be worth exploring. Such an investigation would require more than a single individual—I don't recommend any field hunting be done by a single person, particularly in a region with known dangers like rattlesnakes and bears.

Historical reports of bipedal primate-like creatures should be examined carefully rather than automatically assumed to be Bigfoot-related. I would like to see a greater examination of the Wetigo (Pecher 1979) or Wendigo stories, especially from the Canadian provinces, with a focus on observational data rather than just folk tales passed from one generation to the next. I suspect that it may be difficult to find Native American informants for recent sightings, but the persistent and patient investigator should find visits to northern Tribal settlements and reservations rewarding.

CHAPTER SIXTEEN

The Pichu-cuate

When mystery snakes are discussed, it's usually the giants that are in the spotlight. People are apt to notice extraordinary size in a snake, but often fail to distinguish subtle differences among the numerous smaller species. To be ethnoknown, a small snake must usually be venomous, have a distinctive morphology, or occupy a unique habitat. Even with known snakes, a common name often covers several nondescript species occupying similar niches. "Black snake" is often used for both *Elaphe obsoleta* and *Coluber constrictor* in the eastern U.S., while "grass snake" might cover species of *Thamnophis* and small specimens of *Coluber constrictor*. Harmless water snakes, *Nerodia*, are often given the mistaken moniker (saddled with all of the accompanying dangerous attributes) of "water moccasin," which is more appropriately applied to the venomous *Agkistrodon piscivorus*.

Newspaper writer Charles Fletcher Lummis collected western and Native American lore as he traveled and studied the inhabitants of the southwest. Lummis (1897) described a small mystery snake in his collection of essays and stories, "The King of the Broncos":

"But the deadliest snake in North America is the tiny and devilish little pichu-cuate, who quite matches the worst serpent of India. Not only the most highly venomous, but the most treacherous, he would be also the most dangerous were he not, luckily, the rarest. He is the only true asp on this continent; and in the United States is never found outside New Mexico and Arizona. That he was also

known to the ancient Mexicans is apparent from his name, which was brought up to our territory by the Spanish conquerors. In all my explorations of the two territories, covering hundreds of thousands of miles of travel and into the remotest corners, I have seen but three pichu-cuates—and all, unluckily, where it was impossible to preserve them. In the same time I found and killed hundreds of rattlesnakes, of all sorts and sizes—a sport of which I must confess myself very fond. But used as I am to snakes, the pichu-cuate always gives me a shock.

“My first meeting with one was in Valencia County, New Mexico, in June, 1889, on the sandy flanks of the Cerro del Aire. I was out hunting jack-rabbits, in company with some Indian friends, and had dismounted to stalk, leading my pet horse by the bridle. My eyes were on a small chaparro bush ahead, when suddenly Alazan snorted, and reared backward so violently as almost to unhinge my arm. I looked about in surprise, for Alazan was too good a horse to mind trifles. As there was nothing to be seen, I started to pull him forward. Again he protested and with evident terror, and, chancing to look at my very feet, I understood his fear, and felt very grateful that his senses were better than mine, for in another step I should have walked upon my death.

“The only thing visible was a tiny object, not nearly so large as a good stag-beetle—merely a head, and perhaps an inch of neck. But it was the most frightful object in its kind that I had ever seen. The head, certainly neither so broad nor so long as my thumb-nail, had a shape and an air of condensed malignity impossible to describe. It seemed the very essence of wickedness and hate, fairly bulging with deadly spite, and growing upon one until it looked several times its actual size. The ugly triangle (which is the distinguishing mark of all venomous

snakes, being formed by the poison gland back of each eye) told me at once that Alazan was keeping up his reputation—never did he shy at a harmless snake—and the tiny horns, which added a peculiar and grotesque hideousness, left no doubt that this was a pichu-cuate. He had buried himself almost to the head in the gray sand, against which his upper skin was barely distinguishable, and thus in ambush was waiting for something to turn up.

"Turning Alazan loose, I knelt at the safe distance of a yard to study the little creature, which fairly swelled with murderous rage. It not only struck madly at the chaparro switch I thrust out to it, but at last, evidently discerning that the blame lay back of the switch, actually followed it up, and with such agility that I had to jump up and back without loss of time. The idea of retreat never seemed to enter that flat head. Sometimes he would lie and puff out with impotent rage, throwing his mouth so wide open that it seemed the venom must start, and sometimes he glided toward me, his head an inch above the ground, with an attitude which seemed to say, 'Stand still there, and we'll see who laughs!'

"At last I killed him. He was neither larger round nor longer than an ordinary lead-pencil; a cold, leaden gray on the back, but underneath rosy as the mouth of a conch shell. The fangs were tiny, not much more than an eighth of an inch long, and as delicate as the tiniest needle. A wondrous mechanism, this mouth, with its two automatic needles, so infinitesimal, yet so perfectly competent! I opened the ugly little jaws wide, pressing upon the sides of the head; and when the recurving fangs had risen from their grooves in the roof of the mouth, and stood tense, a stream so inconceivably fine that the eye could barely note it spurted from each, and in the space of two or three inches melted into invisible spray. Yet that jet, finer than a cobweb strand, was

enough to give swift death to the largest and strongest animal that walks.

"When the hunt was over, I told my Indian chums of the pichu-cuate, and asked them many questions. They all knew of the snake, though several had never seen one, and all agreed that it is extremely rare. The crotalus ranks among the Pueblo divinities, and their charmers have no difficulty with that steady-going and respectable reptile. But even among these people, with whom the cult of the rattlesnake has such astounding features, and where, until recent years, every Pueblo village kept a sacred rattlesnake in a sacred room, with special priests to attend him, the villainous little sand viper is accursed. Even those who have 'the power of the snakes' can do nothing with him. He scorns to be tamed, even by the dropping upon his head of the mystic pollen of the corn-blossom.

"And he was more dangerous than the rattlesnake? Oh, yes! A thousand times worse than Ch'ara-ra-deh! No one ever got well if the pichu-cuate bit him. Even a medicine man once, who knew all the sacred herbs, and so was proof against snakes, brought a pichu-cuate in his blanket to the pueblo to tame it. But when he let it out upon the floor and sang to it, and went to take it up, it struck him in the wrist, and he fell down and died in the time one could count fifty. All remembered, too, the fate of Cruz Abeita, a young man who had gone out to the *llano* to herd cattle. Clearly, he had seen a rabbit run down its burrow, and had tried to get it out with a switch, for when they found him he was lying there, terribly swollen and black, with his arm still down in the hole; and in his other hand, clenched with the grip of the dead, was a crushed pichu-cuate. Hidden in the sand, it had struck him in the face while he was reaching after the rabbit, and both had died together. They had heard of other

cases (and so have I) of the bite of the American asp, and always with fatal results.

"No! But there was a man, and he is the only one that was ever struck by Pichu-cuate without dying," said Francisco. "And he was a Moqui that I knew. He is of the snake-men there, who make the rattlesnake dance, so he has the power of the snakes. But it was not for this that he escaped; and though he lives, he can no longer weave—he who was before one of the best *manta* weavers of the People of Peace.

"He chanced to be coming one day from Ohuatu-e, and, sitting down in the desert to rest, put his hand back, and felt himself struck in the knuckles. Thinking it to be a rattlesnake, he rose and turned to charm it, but when he saw it was Pichu-cuate, against which even the *mah-que-beh* is no remedy, he took his hunting-knife like lightning and chopped off his right hand at the wrist, afterward killing the snake. And for many weeks we looked for him to die. Since then he can no longer charm even the rattlesnakes, for when he sees any snake his heart dies in him, and the snake, beholding that he is afraid, will not obey him, but always fights. Ay! such is Pichu-cuate! *Buena suerte* that yonder one pricked you not!"

"And I heartily agreed with Francisco."

Lummis gave a good detailed description of the snake he calls pichu-cuate—a small burrowing viper with supraocular horns, the dorsal coloration gray and the ventral a rosy color. The problem is that no such snake is recognized to exist in New Mexico or Arizona. The only front-fanged venomous snakes in those two states are rattlesnakes and coral snakes.

The name *pichu-cuate* is a generic name that is given to snakes believed to be venomous, whether or not the snake actually is. Several variations of the name exist. Campbell and Lamar (1989) listed the name under the cantil, *Agkistrodon bilineatus*, in the

Mexican states of Jalisco, Nayarit, Sinaloa, and Sonora. This species is nothing like the snake Lummis describes, being a heavy-bodied viper without horns and with very distinctive head stripes. Andrés García of the University of New Mexico's Museum of Southwestern Biology commented on this (pers. comm.): "I spent 15 years in the coasts of Nayarit, Jalisco and Colima. I never heard that name, people used to call [cantils] 'gamarrillas' by the lines they have at both sides of the head, as those things people put in horses' head to ride them." The cantil also has proportionally large fangs. It is not found near the United States.

Another individual familiar with Mexican herpetofauna told me that the colubrid snake *Trimorphodon tau* is called "pichicuate" in central Mexico. Herpetoculturist Brad Kalota passed along a reference in Roger Conant's autobiography, where Conant captured a specimen of *Thamnophis rufipunctatus*, exciting the locals. Conant (1997) stated, "So I had caught a legendary snake, one of a variety of species to which the same colloquial name was given." Later, Conant noted, "I did some research and found that the appellation 'pichicuate' was loosely given to any usually grayish, triangular-headed, presumed venomous snake. The pichicuate was alleged to be more dangerous than the largest rattlesnake. The name obviously derived from folklore rather than from any knowledge of the anatomy of the snakes themselves."

One New Mexico resident, responding to my newspaper query, noted her father's experience with the term: "My father says they were forbidding looking but harmless, though many people thought they were venomous. He says that in the 1920s many a dance was broken up for a while when a pichu-cuate was turned loose on the floor! This was in San Marcial, NM, south of Socorro."

There may be a tendency to ignore this cryptid as just a serpentine bogey used to scare the unwary. Certainly, without Lummis' details, there is little evidence for an unrecognized species. But Lummis was very clear in his description that this was, in fact, a truly venomous snake—only viperids, among North American snakes, have the mobile fangs he described. We must be careful not to confuse the two levels of ethnoknowledge: one for a specific

snake, the other for a generic one. Similarly, "water moccasin" truly only refers to a species of *Agkistrodon*, but is given to any number of harmless snakes by the uninformed.

So what about Lummis' description of the snake? Does his snake resemble any New World vipers? The most distinctive characteristic given is that of supraocular horns. Only a handful of New World snakes have these. In Latin America, it is limited to the sidewinder, *Crotalus cerastes*, the eyelash viper, *Bothriechis schlegelii*, the Mexican horned pitviper, *Ophyracus undulatus*, and the montane pitviper, *Porthidium melanurum*. Cohen and Myres (1970) suggested that such horns protect the eyes of the snakes by folding down under pressure while the snake travels through burrows.

The sidewinder was well-known to Lummis, and we can easily dismiss the arboreal and colorful eyelash viper. This leaves *Ophyracus* and *Porthidium*, which are both found in central and southern Mexico. *Porthidium melanurum* has a dorsal coloration ranging from pale gray to orangish brown (Campbell and Lamar 1989), with a distinctly black tail and a pale lateral stripe on each side. *Ophyracus undulatus* has a background coloration of gray, yellow, or brown, and is reddish gray ventrally.

Ophyracus seems to resemble Lummis' pichu-cuate closest, but we run into a problem geographically. It is known only from the intermediate elevations of the Sierra Madre Oriental, Mesa del Sur, and Sierra Madre del Sur, which are nowhere near New Mexico and Arizona. It is considered semi-arboreal, though Campbell and Lamar (1989) noted that it is "found most frequently on the ground and often takes refuge under rocks or logs."

One interesting note is made by Campbell and Lamar in this species' account: "Even more problematical is a snake reported from Actopan, Hidalgo, which represents the only specimen known from the region; the vegetation of this locality is tropical arid scrub. This specimen may have been collected in the mountains to the east of Actopan, which appear to contain suitable habitat. Alternatively, the specimen may have come from the vicinity of Actopan, Veracruz, but this locality is at a much lower elevation than *O. undulatus* is known to inhabit."

I can only suggest a few possibilities here, assuming that

Lummis was correct in his description. Either *Ophyracus undulatus* inhabited a broader range in the past (rather unlikely, considering the current limits in elevation), or there was a small, undescribed species of viper, perhaps related to *Ophyracus*, reaching at one time into North America. Unfortunately, I have not seen any modern reports of such a snake, so it is possible that it no longer exists. This is not unexpected—there are several species of rattlesnakes from the southwestern states and Mexico that are threatened or endangered.

The top priority here would be an ethnoherpetological survey of the Native American groups dwelling in the appropriate regions of New Mexico and Arizona. I have not been able to locate the "Cerro del Aire,"—the only summit by that name that I have come across is in Taos County, farther north. Valencia County was much larger then than it is today, so it may be closer to the Arizona border. Investigation at appropriate historical societies will be necessary to pinpoint Lummis' locale.

Another possible place to investigate this reptile is the Charles Fletcher Lummis collection of photographs and artwork at the Southwest Museum in Los Angeles, California. Lummis took on many roles in his life—newspaper editor, activist for Native Americans, preservationist—and his experiences may include other interesting natural history observations.

I will caution that no investigator should actively search for this snake in the field without having experience with venomous snakes. Rattlesnakes and scorpions will be common in this region, as well. Envenomations can be quite dangerous when you are far from medical attention—so don't touch.

CHAPTER SEVENTEEN

Giant Snakes in the Everglades

Giant snakes are quite common in North American folklore. Actually, most snake-inhabited regions around the world inspire legends of oversized serpents. Here in North America, many tales of serpentine creatures involve aquatic serpents, which muddies the distinction between giant snake folklore and lake monster folklore. The terrestrial reports are usually just described as *typical* snakes—long of length, wide of girth, and often compared to logs, barrels, or telephone poles.

One of the earliest serious efforts to locate supposed giant snakes came from Hugh L. Willoughby, the first white man to traverse the Everglades. Familiar with the other large reptiles of those wetlands, the alligator and crocodile, Willoughby was intrigued by reports of giant snakes in the region. The following is his narrative of a search he made for a giant snake's skeleton (Willoughby 1910):—

With an apology for my slight digression, we will return to our coasting trip and our unsuccessful crocodile hunt on Card Sound. I had originally intended to hunt crocodile for a few days more, but, knowing the water in the Everglades would be getting lower as the month advanced, I considered it prudent to push south, knowing well where the largest crocodile lived, intending to return in March for a systematic hunt after my winter's work in the Everglades had been accomplished.

On the 31st of December we got the "Cupid" under way and ran as far as the mouth of Jew-Fish Creek.

The creek is nothing but a very narrow passage which connects Barnes Sound with Black Water Sound. I am using here the names as given by the Geodetic Coast Survey Chart. Barnes Sound is known to the natives as Little Card Sound, and the northeast end of Florida Bay is called by them Barnes Sound. Comparatively little is known of these sounds, especially the northwest shores, as the few people who live in Key Largo and the smaller keys use the better water communication of the Hawk Channel for the transportation of their produce. Jew-Fish Creek has rather a blind entrance, which passes through a heavy growth of mangroves.

The water is quite deep and the current runs through with great swiftness, and is a fine place for all kinds of fish. The channel divides into two or three branches, the one running nearest Key Largo being the best. With a light wind we sailed across Blackwater Sound, which is a pretty slice of water nearly circular, and about four miles in diameter, making a course nearly west, in order to find the opening which leads into the Bay of Florida, called Boggy Creek, a rather difficult place to get a sailboat through, as the bottom is so soft that a pole pushes in to its full length.

There is a second opening to the bay, more to the northwest, which runs into several small landlocked bays. After much difficulty we succeeded in getting through "Boggy," and anchored for the night near its opening into the Bay of Florida. From here I took a westerly course, which was somewhat out of my way, in order to reconnoitre the uninhabited northwest shore of this large bay, and also to prove the accuracy of a statement by Ed Brewer, that a year and a half ago, while hunting on a certain creek, he had killed a great snake of a kind that he had never seen before. This creek leads directly to the Everglades. Brewer believed that he could take me to

the very spot, and thought that perhaps I might find others of the same variety. I have for a long time believed that in the southern part of Florida there exists a snake of immense size. What this snake is has been my longing desire to discover.

Many absurd and sensational stories have been circulating this winter, without any truth in them whatsoever, concerning the capture of this huge reptile. A circus charlatan brought a python from the North in a box. He disappeared for a few days, and returned to the settlement with a twelve-pound snake in a bag, that he claimed to have captured on Long Key, which is in the Everglades. I am quite sure that without an Indian guide this man never reached that spot alone. But the fraud was quite successful, and the newspapers were completely taken in. Taking the sloop along the northwest shore as far as the water would permit, Brewer and I left the "Cupid" in charge of Sam, and with the "Coscochee" started for the "Land of the Big Snake."

Leaving the main part of the bay, we entered a smaller one, which we crossed, and with unerring accuracy Brewer steered for what appeared to be a solid wall of trees; but on reaching it a hole in the foliage was seen, from which a fresh-water stream was issuing. The water was perfectly clear, and just after entering I could see many fish. Reaching for my light spear, I soon landed three fresh-water garfish. Continuing further up the stream, the foliage became more tangled and made our progress very slow, until we reached what seemed to be the head of canoe navigation. The scene would rival some of those depicted on the Amazon River. The hanging vines, the tropical foliage, obscured nearly all light, and the air had an earthy, snaky smell.

Brewer, who had been pulling the canoe along by the overhanging branches, stopped and said, "We are near the place where I killed the snake." I

immediately felt for my revolver, thinking there might be a whole den of pythons somewhere in the vicinity that had come to the funeral of their progenitor. The place itself was certainly the snakiest one I had ever been in. Brewer crawled on shore, with his head to the ground, and began lifting up the rotten leaves, examining everything very carefully.

This search went on for half an hour, when he said, "I have got it, but the buzzards have scattered the bones pretty bad!" I jumped out of the canoe at once and joined him, all eagerness to find a skeleton that might have belonged to the strange variety I have been in search of. Under the first layer of leaves was a section of vertebra, evidently that of a snake; its diameter, as compared with snakes I had usually seen, seemed very large. By clearing a space of ten feet around, we uncovered more pieces of the backbone and a great number of ribs. I returned to the canoe for a pail, and after a long period of careful work we recovered more than two-thirds of the entire body, but nothing as yet of the head, that I was so anxious to find; among the last two pieces, however, I discovered a bit of the jaw, with a large fang sticking in it.

That fang told me much, as I could plainly see the capillary tube running through it, which indicated to me rattlesnake. I did not, however, wish to decide hurriedly as to this fact, and preferred to wait until I had assembled the bones into the full structure, at the University of Pennsylvania, in consultation with the professors skilled in osteology. I got Brewer to tell me again of the killing of this reptile, a year and a half ago. It seems he had been hunting and exploring up this creek, in order to find a canoe passage that would lead to the Everglades. Pushing his way through the thick foliage, as we had done, he saw a little way ahead of him, on the low limb of a tree, what seemed to be the largest snake he

had ever seen in his life. The snake he described as having longitudinal stripes, and not looking like a rattler. To pick up his shotgun and fire was the work of a second. The snake was badly riddled. He approached with the idea of dispatching him and taking his skin, when he was overpowered by a strong sickening smell, which caused him great sickness of the stomach and faintness. He lay in a partly unconscious condition for some time, and when he recovered sufficiently, he readied his canoe and made his way to the coast without paying any more attention to the snake. On my return to the North, the skeleton was carefully put together, and it was decided that it had belonged to a rattlesnake, but the formation of the vertebræ seemed to be different from those of the usual variety of the Florida rattler, which may account for the observation Brewer had made of the longitudinal stripes. In life it would have been about eight feet in length.

That great snakes of some species do exist in Florida, yet to be observed, I have not the slightest doubt. I pin my faith to the account that two different Indians have given me of snakes that were at least eighteen feet in length, and evidently belonged to the constrictor family. As I have remarked before, I have never found a Seminole to lie. I did not explore the head of this creek, but I am under the impression that it reaches to within two miles of the Everglades.

Unfortunately, while an eight-foot long striped rattlesnake might be unusual, the size is within the known lengths reached by the eastern diamondback rattlesnake, *Crotalus adamanteus* (Conant and Collins 1998). Striping may appear as a regional variant or just an unusual phenotype, and is not itself a good indication of uniqueness.

It would be interesting to know whether the Seminole and other tribes in southern Florida still have knowledge or folklore of oversized snakes. The tropical climate of that region would be

more conducive to a large constrictor's survival than just about anywhere else in the country. In fact, it has allowed at least two species of introduced snakes, *Boa constrictor* and *Python molurus* (Morgan 2002), to survive after being released in the wild. Some of the snakes may have been intentionally released, while others may have been liberated by Hurricane Andrew. Both species are now believed to be breeding in southern Florida. Obviously, any evaluation of giant snake reports from that region must strongly consider the possibility of feral exotics. Vague descriptions are not enough to determine whether a snake is a known species or not.

CHAPTER EIGHTEEN

The Broad Top Serpent and other “Boss” Snakes

Pennsylvania's forests and mountains are the setting for numerous folk stories about giant snakes. Most of the tales involve clearly terrestrial snakes, while those from surrounding states (Ohio, Maryland, and New York) often involve semi-aquatic serpents. While we can file immense “log snakes” (Frazier 1997) and the like into the bestiary of tall tales, there are others which are not so easily dismissed.

The most famous of the Keystone State's mythical reptiles is the Broad Top serpent. The Broad Top mountains in Huntingdon County (near Raystown Lake) and Bedford County are host to numerous sightings of large snakes dating back to the early 1900s. Several authors (Baughman and Morgan 1977; Baughman 1987; Wilson 1998) have chronicled these stories, and there are characteristics which crop up time and again.

The estimated lengths of the snakes are usually in the 18 to 20 foot range, while a few witnesses describe even larger serpents. When coloration was noted, it was “slate grey in color, with yellow markings around its neck and around its eyes” (Baughman 1987) or “scaly dirty tan color with variegated markings” (Wilson 1998). Up until the 1950s, most sightings were in the Hickory Hill-Saxton Mountain region. After that time, reports have come from various locations in this region, with mining operations suspected as a possible instigator (Baughman 1987). The snakes have been seen most often crossing roads—a few were observed crossing railroad tracks, lying in briar patches, draped over strip mine refuse piles, or sunning themselves in grassy cemeteries. One was seen eating a rabbit (Wilson 1998), while a group of hunters claimed to have watched one trying to swallow a young deer.

These snakes are not seen regularly, and there are only a few cases from the last decade. Jon Baughman is editor of the Saxton newspaper, the *Broad Top Bulletin*, and has ardently collected sightings of these reptiles. His dedication is the only reason we have most of these reports today. Baughman (pers. comm.) noted that one contemporary sighting came from a woman who saw a large snake along the bank of Raystown Lake in the early 1990s. The most recent sighting (Watson 2000) comes from three men who drove up to a snake crawling across Enid Mountain Road, or Route 1025, a two-lane paved road, one August morning just before dusk. They stated that the snake was "slate grey in color with white markings" and, from measurements made later at the same spot, they had seen "at least 17-ft. of it covering the road and really couldn't tell how much of it was in the woods."

In 2002, I contacted Jon Baughman to learn more about these mystery snakes, and he ran a brief letter for me in the *Bulletin*. As a result, a woman responded who had been fortunate enough to have closely encountered one of these snakes. This witness was driving along the two-lane highway south of Harbor Mountain in 1987, when she (pers. comm.) "saw a huge snake coming down off the hill to my left. I couldn't believe what I was seeing, so slowed down watching it out of my side mirror. When I came to a stop (then & now there's not enough traffic on that road to worry about) the snake stopped dead behind me. I figured the snake was playing dead and got out of my car and stood beside it. The snake's head was in the brush on my side of the road and its tail clear across the road on the other side. I stood there for several minutes just looking. It didn't move an inch. I got worried that it would still be playing dead for ages after I left and get run over so I stomped my foot beside its tail and the snake took off in the direction he'd been going. As to what the snake looked like, its head was hidden in the brush. I never saw it. As best I can describe the color, the snake was a very pale tan, maybe the color of pinewood. I don't remember any pattern, nor did I see his belly. I've seen some impressive black snakes in the area and it was nothing like them. It was thick around, like a boa or python."

This witness had not realized that such snakes were even part of the history of this region, until she saw the letter in the *Bulletin*.

She had once tried to get information from a Pennsylvania herpetological society, but they were, of course, unable to provide any answers. With most witnesses, there's an apprehension of these snakes—the three men who saw the large snake in 2000 were unwilling to get out of the truck. This woman, however, has always had an interest in snakes, and currently keeps a corn snake as a pet. Really, we need more witnesses like this! Her estimate of the snake's length was, based on measurements after the fact, about twenty-two feet that she could actually see (Watson 2002).

Boss Snakes

Boss snakes are the colloquial equivalent to "king rats"—unusual size in an ethnoknown species lends itself to distinctive nomenclature. While not in the Broad Top region itself, there are historical reports of giant snakes from nearby counties. One interesting account came from York County, where a man came upon a snake's shed skin. Shed skins do stretch a small amount, but this report still suggests a large snake:

"The Boss Snake Story.—Mr. Solomon Smith, who is regularly employed at the Billmyer & Small Co.'s car shops, states that while visiting his parents, in Codorus township, several days ago, he accidentally found the hide of what must have been a huge black snake. The hide was stretched out on the ground, and accurately measured, with the following result: Length 14 feet and 3 inches, width 1 foot and 7 inches. Mr. Smith says that any one who may doubt the statement, can go to his father's farm in old Codorus, and be convinced of its truthfulness.—York Age" (Anonymous 1883).

Gettysburg, Adams County, is home to the well-known Civil War battlefield. One of the significant historical spots in the area is Devil's Den. While there are several theories as to why it carries this name, one conjecture is that it was the home of a large snake.

Salome Myers Stewart was a Gettysburg resident who became a volunteer nurse after the battle there. In a 1913 newspaper article, she gave an account of how the Devil's Den acquired that name: "As a child, I have heard [my uncle] tell of the snakes which infested the country, and had their 'den' among those huge rocks. Parties of men were organized to rid the neighborhood of these dangerous reptiles. One big old snake persistently eluded them. They could never kill or capture him, and they called him 'The Devil.' He finally disappeared, and it was supposed that he died in his 'Den.' So, to Gettysburgers, that has always been 'Devil's Den'" (Adelman & Smith 1997). Another account notes a large snake seen at a nearby site, Round Top:

"Big Snake.—Mr. Emanuel Bushman, of this place, communicates the following to the Baltimore Sun:

"The now famous Round Top, a few miles from Gettysburg, years ago was the rendezvous of as large a snake as the Hall Springs snake of Baltimore city. I do not believe that Mr. Lee has exaggerated his large reptile. One sunny day of 1833 my brother, with six others, were exploring Round Top for the first time. The hill and surroundings were covered with a dense forest. As they were ascending the west side they suddenly came upon a monster snake, sunning itself upon the rocks. Part of them took to flight, but brother and two others stood to see how it would end. They described it as a black snake, apparently turning gray from age. Brother hissed the dog on it, and he thought from the capacious mouth that it would swallow the dog. They estimated its length to be from fifteen to twenty feet, and the thickness of an ordinary man's waist. They threw at it from above and it rolled into its den. Father saw it before that about a mile from there at the big rocks, called the Devil's Den. Frank Armstrong saw it and was badly frightened. Grandfather saw it in his time, and mother says the Indians used to speak of it as 'heap big snake.' Mr. Michael

Fry, living near Round Top, saw it about thirty years ago, which is the last time I heard of it. How old do they get? Father says tradition traced it back one hundred years. Brother and Mr. Fry are the only two living who claim to have seen it" (Anonymous 1875).

The following article comes from a scrapbook of Gettysburg *Compiler* articles, located in the Adams County Historical Society, and is probably from the late 1800s:

"As Big as a Stove Pipe—And Fourteen Feet Long was the Size of a Snake Seen on Wolf's Hill. (?) (Written for the Compiler)—Some years ago I heard a snake story told by a citizen of our town which was quite an experience and he declares kept him back in his growth one year.

"With several friends they decided to take a hunt on Wolf's Hill. When near the thick pines they flushed a pheasant which flew into the pines. They then decided that one should go on each side of the thicket and one through the thick pines and brush and make all the noise possible so as to chase the bird out. The [task] fell to our friend (who is seen on the streets almost any time in the day) to go through the brush. And here is his story as told in a cigar store that evening.

"I could not carry my gun so I left it with one of my friends, I started through the thicket. After going some distance I found the only way to get through was to get down on my hands and knees. I had not proceeded in this way very far before I saw not over 2 ft. from my nose an immense snake thirteen or fourteen feet long and about the size of a stove pipe through. My hat hung suspended by my hair above my head a foot. I started to back out, and had not backed far when I ran against a tree, I thought there were snakes all around me, how I ever

did get out I cannot tell. I thought the snake had me for sure. Scared! Well I guess I would not have gone back into that thicket for a thousand dollars. If that snake is still living out there, he must be as large as one of those telephone pole.' L. F."

Considering all of the reports, we can put together a cryptid profile—a snake that consistently reaches 15-20 feet in length (reported larger in a few cases), may be tan or gray in coloration (with light-colored markings noted in several cases), and resides in rocky mountainous regions. A profile like this is only a generic description, though. It should not be taken at face value.

First, the majority of these sightings were brief, and the witnesses were usually more scared than curious. It is difficult to accurately estimate the length of a snake in these circumstances. Actually, I've seen people who own boas and pythons drastically overestimate the length of their own pets. Even by reducing the estimated lengths to compensate for witness exaggeration, however, we still have a snake that is larger than either of the two big snakes in Pennsylvania—the black rat snake (*Elaphe o. obsoleta*) and the black racer (*Coluber c. constrictor*). Boundy (1995) noted the maximum length for each species as 2562 mm and 1905 mm respectively. Neither species is particularly bulky as it grows, though the racer is certainly much thinner than the rat snake. Both species are known to prey on mammals as large as young rabbits (Ernst and Barbour 1989).

The coloration and bulk of the reported snakes excuse the racer as a possible candidate. Racers in Pennsylvania run from a bluish-gray to a dark black, whitish under the chin and ventrally. They have no variegated markings on their lean bodies. Racers rely on speed to capture some prey species, so they do not bulk up as other colubrids might. The black rat snake is another matter, but in Pennsylvania this subspecies is very dark. The specimens that I have seen in Pennsylvania are black enough to make their pattern indistinguishable from the background. They become flecked with yellows and reds as they reach further west in Ohio, Kentucky, and beyond. The background coloration of gray or tan in the giant snakes does not match the Pennsylvania black rat

snakes. I should also note that snakes do not gray with age as one of the historical reports implies—coloration can change during maturity from juvenile to adult, but the adult coloration does not fade as it gets older. Snakes may turn bluish-gray when they start the shedding process, but they are unlikely to go wandering at that time, as their eyesight is briefly impaired and they are vulnerable to predators.

While early newspaper reports suggested that these giant snakes are descendants of pythons or boas that escaped from captivity, it is much more likely that we are dealing with a colubrid. Boids are tropical species, and are unlikely to develop the necessary brumating abilities (similar to mammalian hibernation) to survive Pennsylvania's winters. Colubrids, on the other hand, have adapted very well to North America's temperate climate and a wide range of environmental extremes. Certainly, there are plenty of caves and mines in the Broad Top region for snakes to stay during the cold months.

How likely is it for a colubrid to reach lengths up to twenty feet? In North America, the largest species are *Pituophis catenifer sayi* at 2743 mm, *Drymarchon corais couperi* at 2629 mm, and *Masticophis f. flagellum* at approximately 2591 mm (Boundy 1995). These don't reach the lengths of the largest known colubrids, though. The maximum length of known colubrids is probably reached by a couple of Asian species: *Zaocys carinatus* can reach 4000 mm, while *Ptyas mucosus* is known to reach 3700 mm (Manthey and Grossmann 1997). In other words, we have biological support for the idea of at least a thirteen-foot long colubrid. Small populations of snakes are known to exhibit dwarfism or gigantism in relation to larger populations, so genetic isolation may be responsible for large specimens. There are certainly enough of groundhogs and other small mammals in central Pennsylvania to support a population of big snakes.

My suspicion is that the large snakes reported in this region, if they exist, are probably related to *Pituophis*. The genus is highly variable in coloration and pattern. The bullsnake, *P. catenifer sayi*, is the largest and occupies a wide range in the midwest. It usually has a light tan to dark red-brown background with dark blotchings. It is a terrestrial snake, often found in burrows and

crannies. Further east are the pine snakes—*P. melanoleucus melanoleucus* in the north and central states, and *P. m. mugitus* in the southeast. While fair-sized and bulky, these do not reach the lengths of a large bullsnake. Over their wide geographic range, these snakes consume numerous small mammals, birds, reptiles, and insects. The interesting thing about *Pituophis* is that it is often found in small disjunct populations in the east. Isolated groups are known in Indiana, Kentucky, Tennessee, Virginia / West Virginia, and New Jersey. The last group is especially intriguing as there really aren't any related populations near it. At one time, biologists in Pennsylvania suggested that we might find *Pituophis* in this state because of its proximity (Surface 1906), but so far that discovery has not materialized. Holman (2000), however, noted that *Pituophis* was recovered from a late Pleistocene site in Bedford County.

A large subspecies of *Pituophis* could certainly account for these reports. It is a large terrestrial colubrid which can adapt to a wide variety of habitats, and would certainly fit well with a rocky terrain with numerous caves and burrows. The coloration in the various reports sound closer to some of the western subspecies than to the eastern subspecies, but would not be out of the question. Additionally, one defensive behavior of *Pituophis* is to puff itself up with air to look larger.

The biggest problem with this idea is that if there is a large colubrid snake, there should be a lot of little ones. So far, no juvenile or sub-adult *Pituophis* have been recorded from Pennsylvania. One possibility is that juveniles may not be recognized as different by the locals in that region. Most Pennsylvania residents do not realize the diversity of ophidian species found around them; it isn't uncommon to hear generic terms like "black snake" used for what could be any one of several distinct species. It is also true that Pennsylvania's herpetofauna is not as well studied as in other states. Hulse, et al, (2001) published results of the Pennsylvania Herpetological Atlas, but was spotty in several areas.

If indeed there is a population of large unrecognized snakes in Pennsylvania, it is probably limited to Huntingdon and a few surrounding counties. It may have had a wider range at one time which has decreased with habitat change and human encroachment.

Regardless of what genera these snakes may be—whether misidentified known species or a new species or subspecies altogether—the best biological model for speculation would be a large-bodied, secretive, burrowing species. We have several analogous models among *Pituophis*. Most of the eastern subspecies are associated with pine-oak vegetation, heavy undergrowth, and dry sandy soil (Conant 1956).

How easy might it be to determine what these snakes are? Two factors work against the investigator—the snakes' natural secretiveness, and the inaccessibility of most of the habitat in question. For the former, I point to Conant's (1956) description of *Pituophis* subspecies:

"Another factor and one that would help to account for the apparent scarcity of both *ruthveni* and *lodingi* is the inherent tendency for pine snakes to hide, to take refuge in burrows and cavities or beneath vegetation, or to burrow into the arenaceous substratum. Although I personally have never encountered either of them in the field, it is probably safe to presume their habits, in part, at least, are similar to those of the eastern *Pituophis m. melanoleucus*, with which I have a somewhat more than passing acquaintance. Finding *melanoleucus* is largely a matter of chance. It is a common and widespread snake in the pine barrens of southern New Jersey, where I live, but it is not often encountered. Although one may go afield repeatedly or drive hundreds of miles over pine barrens roads, two or three specimens a season is a good average. I would be at a loss to suggest any one place where I could guarantee to find *melanoleucus* even during a week of intensive collecting."

The other issue is that much of the Broad Top region is privately owned. One large portion of land with suitable habitat is owned by a private out-of-state hunt club which has had several confrontations with locals. (In one case, locals dynamited a gate.) Trespassing is discouraged. It may be possible to get permission

to search other properties, but it may take some time to track down land owners, so I suggest that investigators get their permissions in order before going out into the field.

One alternative method is to cruise the roads adjoining suitable habitat in the mornings and evenings, when reptiles are most likely to be on the move. I have taken several trips to this region doing just that, and have come across snakes and turtles as they attempt to cross roads or use them for basking. Roadkill should also be carefully investigated. Fitch (1987) stated, "Roads that are ungraded, little traveled, and narrow, with natural vegetation encroaching close to the wheel tracks, offer the best opportunity for finding snakes alive." I will say that road-cruising is usually not as productive in northern states as it is down south, but if it is done consistently over long periods of time, it might have a chance of obtaining a specimen. The only caution, of course, is that rattlesnakes and copperheads are in the Broad Top region, and should be avoided by those who do not have experience working with them.

Snake traps might be considered, if property owners are willing to allow them. Tin sheets and boards can be set out in spring, and regularly checked for visiting snakes. *Pituophis* is known to frequent logs and stumps, so an artificial shelter constructed along those lines should be considered.

Pennsylvania currently requires a fishing license from those who hunt reptiles. A suspect snake should be photographed in situ, and then bagged for remote study. Only those individuals who are proficient in snake identification should actually hunt these cryptids, as we do not want known native species to be disturbed unnecessarily.

CHAPTER NINETEEN

Dwarf Seals

Every once in a while, an investigator comes across just a bare mention of an as yet unrecognized animal, and think, *now why aren't there any of those?* With me, it's dwarf seals. As diverse as pinnipeds are, I would think that a few smaller species would be known. I can see how polar species might require larger body masses, but there are temperate and tropical seals as well. The smallest known species, considering adult size, are phocids like the Ladoga ringed seal, *Phoca hispida ladogensis*, and the Lake Baikal seal, *Phoca (Pusa) sibirica*, with lengths around four feet at maturity.

What triggers the issue of existence, naturally, are a few brief ethnozoological observations I have run across. (So brief, that this will be the shortest chapter in this book.) The first comes from explorer Knud Rasmussen, who collected folklore from the Copper Eskimos on Victoria Island—part of the Canadian Arctic Islands and now divided (politically) between Nunavut and the Northwest Territories. Rasmussen (1932) recorded, "They have heard of dwarf seals, which are thought to live in the great lake of the Netsilik: Willerstedt Lake. These seals are quite small but just like other seals. They are no bigger than that they can be carried in a game bag, and yet the bull seals smell just the same as real old bull seals."

Not much to go on. Obviously, ethnozoological differentiation by separate cultures are made from different perspectives—for us, smell may not seem like a good method to determine maturity in a species, but that may just be because we have never tested that characteristic for reliability. Obviously, we would prefer more specific morphological characters. It would be interesting to know

whether Canadian scientists visiting Willerstedt Lake have noted such small seals, or whether the Native Canadians in that region still include a dwarf seal within their ethnozoological classification.

The second account of dwarf seals comes from the United Kingdom. Two species are regular residents to U. K. territory—the grey seal, *Halichoerus grypus*, and the common seal, *Phoca vitulina* (Bonner 1972). A few others, polar species, are occasional visitors. In an early mention of the seals which visited the Hebrides, Hamilton (1860) recorded two species—the common seal, locally known as the *Rawn*, and a larger species, *Tapvaist*. He also noted a third ethnoknown seal from those islands: “The third species is of a very diminutive size indeed, and is known by the appellation of *Bodach*, or old man.” Hamilton did recognize the unusual nature of such a seal, and included a footnote—

“We may here introduce the few observations contained in the manuscript so often alluded to, concerning the third variety of the Western Islands, in the hope that further attention will be directed to the subject.

“‘The *Bodach*, or *old man*, is by much the least of all the Seals with which I am acquainted; and indeed, so small, that for a long time I entertained the idea (contrary to the firm opinion of the natives) that it was the young of the Common Seal. This view, however, I consider to be erroneous, for they are not even the size of a Seal three months old of the common kind. Besides, they are frequently killed of this size with grey beards and decayed teeth. I have frequently noticed that when on shore, on the same rock with other Seals, they do not lie near them, but a little way apart. They are but few in number, and I cannot recollect seeing any two of them together. They are not, however, at all so shy as the Common Seal, nor so solitary as the *Tapvaist*.’”

Might any British museums have specimens of such small seals? If Hamilton’s source was correct, physical characteristics

should indicate maturity in small skulls. Of course, even if dwarf seals existed in the 1800s, they are probably gone today—there have been numerous seal studies in the Hebrides without any indications of an unknown dwarf species. It is difficult to speculate on the viability of any unknown seal populations, considering the current turmoil in northern water ecosystems and several known cases of deadly viral outbreaks in pinnipeds..

CHAPTER TWENTY

Merfolk and Sea Monkeys

It seems appropriate to provide an early discussion of aquatic mermaids and mermen from an introduction to the "herbivorous cetacea," or sirenians, by Hamilton (1860). He neatly summarized the forms of merfolk usually observed and furnished several stock answers to why such creatures are seen.

Our declining space prevents us from saying more on the classification of this small and interesting group than what has already appeared in the Introduction. Though individuals belonging to it exist in large herds in many quarters of the globe, yet, till within a few years, not one had been seen in the civilized world, nor had any correct description or delineation been supplied. And yet the most intense interest was experienced regarding the family, not only by the man of science, but by the public at large. There can be no doubt that in many instances they formed the type of those ideal objects of ancient poetry, the tritons, half men and half fish, who had power, forsooth, to calm the stormy surge, and probably, too, of the syrens, those sea nymphs whose melody charmed the entranced voyager to his destruction! The fancies of the northern nations were not less imaginative. "Beneath the depths of the ocean, an atmosphere exists adapted to the respiring organs of certain beings resembling, in form, the human race, who are possessed of surpassing

beauty, of limited supernatural powers, and liable to the incidents of death. They dwell in a wide territory of the globe far below the region of fishes, over which the sea, like the cloudy canopy of our sky, loftily rolls, and there they possess habitations constructed of the pearly and coralline productions of the ocean. Having lungs not adapted to a watery medium, but to the nature of atmospheric air, it would be impossible for them to pass through the volume of waters that intervene between the submarine and the supramarine world, if it were not for their extraordinary power of entering the skin of some animal capable of existing in the sea. One shape they put on is that of an animal human above the waist, yet terminating below in the tail of a fish; and thus possessing an amphibious nature, they are enabled not only to exist in the ocean, but to land on the shores, where they frequently lighten themselves of their sea dress, resume their proper shape, and with much curiosity examine the nature of this upper world."*

But we must endeavour to give our readers a nearer view of these wondrous creatures. Not many years ago the Wernerian Natural History Society (and to its praise we tell it) publicly offered a prize of considerable pecuniary value to the individual who would first present them with one of these far-famed animals; and by many this offer was regarded as a proof of weakness and credulity. Not long afterwards, however, the following statements appeared in one of the periodicals of the day, for the general truth of which, from personal knowledge of some of the parties, we can vouch. "A short while ago it was reported that a fishing boat, off the island of Yell, one of the Shetland group, had captured a mermaid by its getting entangled in the lines!! The

*Hibbert's *Shetland Islands*, 4to, p. 566.

statement is, that the animal was about three feet long, the upper part of the body resembling the human, with protuberant mammæ like a woman; the face, forehead, and neck, were short, and resembling those of a monkey; the arms, which were small, were kept folded across the breast; the fingers were distinct, not webbed; a few stiff long bristles were on the top of the head, extending down to the shoulders, and them it could erect and depress at pleasure, something like a crest. The inferior part of the body was like a fish. The skin was smooth, and of a grey colour. It offered no resistance, nor attempted to bite, but uttered a low plaintive sound. The crew, six in number, took it within their boat, but superstition getting the better of curiosity, they carefully disentangled it from the lines, and a hook which had accidentally fastened in its body, and returned it to its native element. It instantly dived, descending in a perpendicular direction."

After writing the above, (we are informed), the narrator had an interview with the skipper of the boat and one of the crew, from whom he learned the following additional particulars. They had the animal for three hours within the boat; the body was without scales or hair; was of a silvery grey colour above, and white below like the human skin; no gills were observed; nor fins on the back or belly. The tail was like that of the dog-fish; the mammæ were about as large as those of a woman; the mouth and lips were very distinct, and resembled the human.

This communication was from Mr Edmondston, a well known and intelligent observer, to the distinguished Professor of Natural History in the Edinburgh University, and Mr E. adds a few reflections, which are so pertinent, that we shall avail ourselves of them. "That a very peculiar animal has been taken, no one can doubt. It was seen and handled by six men, on one occasion, and for some

time, not one of whom dreams of a doubt of its being a Mermaid. If it were supposed that their fears magnified its supposed resemblance to the human form, it must at all events be admitted that there was some ground for exciting these fears. But no such fears were likely to be entertained; for the Mermaid is not an object of terror to the fisherman, it is rather a welcome guest, and danger is apprehended only from its experiencing bad treatment. The usual resources of scepticism, that the Seals and other Sea-Animals, appearing under certain circumstances, operating upon an excited imagination, and so producing ocular illusion, cannot avail here. It is quite impossible that, under the circumstances, six Shetland fishermen could commit such a mistake."*

Having thus supplied a narrative of a personal interview with a Mermaid, we shall next do as much for the Merman. "About a mile from the coast of Denmark, near Landskrone, three sailors, observing something like a dead body floating in the water, rowed towards it. When they came within seven or eight fathoms, it still appeared as at first, for it had not stirred; but at that instant it sunk, and came up almost immediately in the same place. Upon this, out of fear, they lay still, and then let the boat float, that they might the better examine the monster, which, by the help of the current, came nearer and nearer to them. He turned his face and stared at them, which gave them a good opportunity of examining him narrowly; he stood in the same place for seven or eight minutes, and was seen above the water breast-high: At last they grew apprehensive of some danger, and began to retire; upon which the monster blew up his cheeks, and made a kind of roaring noise, and then dived from their view."

* *Edinburgh Magazine*, vol. xiii.

In regard to his form, they declare in their affidavits, which were regularly taken and recorded, that "he appeared like an old man, strong-limbed, with broad shoulders, but his arms they could not see. His head was small in proportion to his body, and had short curled black hair, which did not reach below his ears; his eyes lay deep in his head, and he had a meagre face, with a black beard: about the body and downwards this Merman was quite pointed like a fish."*

As illustrating the habits, and still more as bearing on the voice, a noted power of these strange creatures, thus distinguished by the great dramatist with not less fancy than fable—

I heard a Mermaid on a dolphin's back—
Uttering such dulcet and harmonious breath,
That the rude sea grew civil at her song.—

We shall transcribe the account of two incidents which were observed in the Southern Hemisphere. "A very singular circumstance happened," says Captain Colnett, "off the coast of Chili, in lat. 24 S., which, as it spread some alarm among my people, and awakened their superstitious apprehensions, I shall mention. About eight o'clock in the evening an animal rose alongside the ship, and uttered such shrieks and tones of lamentation, so much like those produced by the female human voice when expressing the deepest distress, as to occasion no small degree of alarm among those who first heard it. These ones continued for upwards of three hours, and seemed to increase as the ship sailed from it. I never heard any noise whatever that approached so near those sounds which proceed from the organs of utterance

* Pontopildon's *Nat. Hist. of Norway*, p. 154. [sic]

in the human species." Captain C. subsequently mentions that one man was so panic-struck, that had he been much longer in landing he would certainly have died.*

And finally, to bring these narratives to a close—"A boat's crew," says Captain Weddell, "were employed in Hall's Island, when one of the crew, left to take care of some produce, saw an animal whose voice was even musical. This sailor had lain down, and about ten o'clock he heard a noise resembling human cries; and as day-light in these latitudes never disappears at this season, he rose and looked round; but, on seeing no person, returned to bed; presently he heard the noise again; rose a second time, but still saw nothing. Conceiving, however, the possibility of a boat being upset, and that some of the crew might be clinging to some detached rocks, he walked along the beach a few steps, and heard the noise more distinctly, but in a musical strain. Upon searching round he saw an object lying on a rock a dozen yards from the shore, at which he was somewhat frightened. The face and shoulders appeared of human form, and of a reddish colour; over the shoulders hung long green hair; the tail resembled that of the Seal, but the extremities of the arms he could not see distinctly. The creature continued to make a musical noise while he gazed about two minutes, and on perceiving him it disappeared in an instant. Immediately when the man saw his officer, he told this wild tale, and to add to the weight of his testimony, (being a Romanist,) he made a cross on the sand which he kissed, so making oath to the truth of his statement. When I saw him, he told the story in so clear and positive a manner, making oath to its truth, that I concluded he must

* *Voyage to the South Atlantic*. London, 1793.

really have seen the animal he described, or that it must have been the effects of a disturbed imagination.”*

We adduce these few as examples of the many statements which from time to time have been made. At the moment, the fact is a matter of nine days' wonder; it is then speedily obscured in the mist of forgetfulness; those who would be thought more knowing than their neighbours treat the whole affair with scepticism and derision, and mankind generally are left in the uncertainty and ignorance in which they were before. We believe there was as much general intelligence concerning this class of animals two or three hundred years ago as there is at the present day; or, to put it in more appropriate words, that there is as much prevailing ignorance now as there has been at any former period. Among the preceding incidents, that derived from Shetland occurred in 1823, and since that time we are not aware that any additional facts have been supplied for general information. We have no doubt that though there was much truth in the narratives, there was also much error; and we must now, so far as we can, supply our readers with such information as will enable them to correct these errors, and to read aright all such histories.

It is here, however, only right to add, that these marvellous stories of Mermaids are not to be associated only with the herbivorous cete now to be introduced to notice. Large allowance must be made for the workings of an excited imagination, in situations of solitude and apprehension, on the unexpected appearance of an extraordinary and unknown object. In many instances, even the animals whose histories we have been reviewing, viz. the Walrus and the Seals, have unquestionably been the originals which

* *Voyage towards the South Pole*, p. 143.

supplied, to wide and credulous circles, the subject-matter of their astonishment and wonder. It will be in the recollection of the reader that we have previously quoted Mr Scoresby's words—"I have myself seen a Sea-Horse under such circumstances, that it required little stretch of imagination to mistake it for a human being, and the surgeon actually reported to me that he had seen a man with his head above the water." Many of these narratives have had their origin in the Northern nations, where the herbivorous cete are certainly rare; and this fact quite harmonizes with the more enlightened belief in these regions, that it is generally some species of Seal, very frequently the *Barbata* or Haaf-Seal, which, from its more solitary habits, has given rise to these legends. And, once more, we have little doubt that the young, especially, of certain species of Whales, from their striking fashion of raising their heads perpendicularly above the wave, and so taking a deliberate survey of surrounding objects, may occasionally have led to the same result. Thus, then, in the ordinary cete, and in the Walrus and Seals, as well as in our herbivorous cete, are we to recognize the original types of nearly all these wondrous tales.

Let me first get my pet peeve out of the way. Merfolk in northern waters, a common locale for such legends, are not going to turn out to be known manatees or dugongs. There have been suggestions of unknown sirenians, for which further investigation may be warranted. Too many writers, however, have taken a small number of cases where misidentification of known sirenians is probable (*e.g.*, from the Caribbean or the Pacific Ocean), and then spun a huge and implausible biogeographic range for known sirenians. The true culprit in most cases will be a pinniped, assuming that the local myth in question is based on any biological species at all. Sirenians may perpetuate mermaid myths in tropical regions (*e.g.*, Williams 1985), but even these are usually based on poor

observation. The sirenians may be ethnoknown themselves, and still contribute to mermaid mythology when the locals fail to discern unusual behavior as being within the parameters of the known species.

One reason for the persistence of sirenian-implication revolves around the purported mammary glands of these animals. Supposedly, female dugongs rested vertically in the water, waves lapping at their breasts. Sailors, being sailors, were presumed to see such creatures and find themselves irresistibly attracted. Heppell (1992-1993) noted that such a theory is absurd—"In the early nineteenth century, Georges Cuvier, a celebrated French anatomist, believed they had breasts on the front of their chests, and often posed with the upper part of their body out of the water. Such was Cuvier's authority that this became the standard way of depicting these creatures, and only in recent years has it become accepted that there is no basis in zoology for these assertions. The mammae are axillary not pectoral, and Cuvier must have been influenced by his desire to explain away mermaids as inaccurate observations of manatees and dugongs."

One of the earliest reports of New World "mermaids," which probably were manatees, comes from the West Indies in 1493, when Columbus' log stated: "*El día pasado, cuando el Almirante iba al Río del Oro, dijo que vido tres serenitas que salieron bien alto de la mar, pero no eran tan hermosas como las pintan, que en alguna manera tenían forma de hombres en la cara*" (Fuson 1987). Roughly translated, this is—"The previous day, when the Admiral went to the River of Gold, he said that he saw three [*serenitas*] come out very high from the sea, but they were not as beautiful as they paint them, that in some way they had a form of men in the face." Keep in mind that Columbus had seen sirenians before, while sailing off the coast of Africa. In any case, it certainly cannot be construed that Columbus believed these creatures were half-fish, half-woman. I suspect that Columbus used the proper common term for these animals, *serenitas*, for that period, given that *manatee* comes from a native Caribbean word which was not spread to the Old World until at least the 1500s.

In contrast to the rather soporific sirenians, most "mermaids" are noted as alert, active, and inquisitive creatures. Glover (1676) provided his encounter with a "merman" in Virginia waters:

And now it comes into my mind, I shall here insert an account of a very strange Fish or rather a Monster, which I happened to see in Rapa-han-nock River about a year before I came out of the Country; the manner of it was thus:

As I was coming down the forementioned River in a Sloop bound for the Bay, it happened to prove calm; at which time we were three leagues short of the rivers mouth; the tide of ebb being then done, the sloop-man dropped his grap-line, and he and his boy took a little boat belonging to the sloop, in which they went ashoar for water, leaving me aboard alone, in which time I took a small book out of my pocket and sate down at the stern of the vessel to read; but I had not read long before I heard a great rushing and slashing of the water, which caused me suddenly to look up, and about half a stones cast from me appeared a most prodigious Creature, much resembling a man, only somewhat larger, standing right up in the water with his head, neck, shoulders, breast, and waste, to the cubits of his arms, above water, his skin was tawny, much like that of an Indian; the figure of his head was pyramidal, and slick, without hair; his eyes large and black, and so were his eye-brows; his mouth very wide, with a broad, black streak on the upper lip, which turned upwards at each end like mustachoes; his countenance was grim and terrible; his neck, shoulders, arms, breast and wast, were like unto the neck, arms, shoulders, breast and wast of a man; his hands, if he had any, were under water; he seemed to stand with his eyes fixed on me for some time, and afterward dived down, and a little after riseth at somewhat a farther distance, and turned his head towards me again, and then immediately falleth a little under water, and swimmeth away so near the top of the water, that I could discern him throw out his arms, and gather them in as

a man doth when he swimmeth. At last he shoots with his head downwards, by which means he cast his tayl above the water, which exactly resembled the tayl of a fish with a broad fane at the end of it.

This is a fair description of the bearded seal, *Erignathus barbatus*. While primarily a polar species, bearded seals are known to wander south. It is, admittedly, difficult for us to understand how individuals could so easily confuse marine mammals and people, but it is necessary to realize that perception must be trained. It is not automatic. We watch Animal Planet and other cable programming that offer as wide an introduction to the animal kingdom as one could imagine—far greater in diversity than would have been conceived by even the foremost scientists centuries past. Two or three hundred years ago, the differences between men and certain animals were confused by anatomical or behavioral similarities which had little to do with today's systematic differentiation. Even now, we have to be careful not to force our preconceptions of "human-like" behavior on non-human species.

Another mermaid-like seal account comes from naturalist James Eight, who served as Naturalist with the Exploring Expedition of 1830 to Antarctica. Clarke (1916) recorded Eight's observations: "There is also a fourth species, which I have no recollection of ever seeing the slightest notice of. It is probably not common, as I saw but one; it was standing on the extremities of its fore-feet (flippers), the head and chest perfectly erect, abdomen curved and resting on the ground, the tail was also in an upright position; the animal in this attitude bore a striking resemblance to the representations we frequently meet with of the 'mermaid,' and I think it was undoubtedly one of the animals of this genus that first gave origin to the fable of the maid of the sea. I regret that I could not obtain a nearer view of this interesting animal. When I approached within one hundred feet, it threw itself flat and made rapidly for the sea: it appeared about twelve or fifteen feet in length, and distinctly more slender in proportion than any of the other species, so much so that the motion of the body when moving seemed perfectly undulating of. Some of the seamen had seen them frequently on a former voyage, and mentioned that they were known

among sealers by the name of sea-serpent, from this circumstance. Some of the teeth were brought to me which had been picked upon the beach. The crown of the grinders is deeply and singularly five lobed." Dr. Charles Paxton (pers. comm.) suggested this was probably the crabeater seal, *Lobodon carcinophagus*, which was not described until 1844.

Besides basic misidentifications of marine mammals, we know that environmental conditions can also create illusions of merfolk. Lehn and Schroeder (1981) noted that thermoclines before storms can create illusions of distorted elongation with a seal or whale that pokes its head up from the water.

Blatant hoaxing is also common. The dried monkey-fish creations that wound their way from Asia and Africa are still as popular as they were in P. T. Barnum's time (Levi 1977). Heppell (1992-1993) reported that these creations were enthusiastically copied by European artists as well. Another form of hoax involves human dramatists. In one odd case, British Columbia newspapers (G. D. 1986) published reports, and photographs, of a blonde-haired topless mermaid lounging on rocks in Active Pass, in June of 1967.

Note, of course, that it is only through the romantic mythification of mermaids, or trips to certain Florida amusement parks, that we encounter gorgeous amphibious females. Most "actual" sightings involve rather awkward beasts. The European "beautiful mermaid" is a cultural icon, though it has filtered into other regions. Siegel (2000) noted that African water-spirit mythology gradually transformed into the traditional fish-tailed mermaid as European culture spread on that continent.

Sea Monkeys of the Maritimes

Are mermaids worth investigating as potential cryptids? Or do we allow mythological status, and thus preconceived notions of what an ethnoknown species must be, to dictate our interests? Mermaids as mythological stereotypes go back thousands of years in folklore and artistic representation. Should the fact that someone then reports seeing an unusual aquatic mammal be dismissed merely because it brings to mind a Greek myth? I suspect that an

unrecognized seal might find itself overlooked if it behaves too much like a "mermaid." Some investigators have considered the possibility of as-yet unknown sirenians, as well—perhaps the extinct Steller's sea-cow was not the only one to inhabit the polar regions.

The only feasible way to investigate reports which are so intertwined with mythology is to target specific regions and discard legends in favor of actual sightings. As an example, here are several reports from the Maritime provincial region of the north Atlantic and the adjacent Great Lakes. Besides the familiar myths of Europeans traveling through this area, there are also Native American myths of mermen. Such myths are not evidentiary, but indicate potential areas where witnesses might be located.

The first story comes from Henry Hudson's second voyage in 1608 (Asher 1860)—

"The fifteenth, all day and night cleere sun-shine; the wind at East, the latitude at noone 75 degrees 7 minutes. We held Westward by our account 13 leagues. In the after-noone the Sea was asswaged; and the wind being at East we set sayle, and stood South and by East, and South South-east as we could. This morning, one of our companie looking over board saw a Mermaid, and calling up some of the companie to see her, one more came up, and by that time shee was come close to the ships side, looking earnestly on the men: a little after, a See came and overturned her: from the Navill upward, her backe and breasts were like a womans, (as they saw that saw her) her body as big as one of us; her skin very white; and long haire hanging downe behind, of coulour blacke: in her going downe they saw her tayle, which was like the tayle of a Porposse, and speckled like a Macrell. Their names that saw her, were Thomas Hilles and Robert Rayner."

The next observation comes from Captain Richard Whitbourne, recording a strange creature from St. Johns Bay, Newfoundland, in 1610—

“Now also I will not omit to relate some thing of a strange Creature, which I first saw there in the yeere 1610, in a morning early, as I was standing by the water side, in the Harbour of Saint Johns, which very swiftly came swimming towards mee, looking cheerfully, as it had been a woman: by the face, eyes, nose, mouth, chin, eares, necke, and forehead, it seemed to bee so beautifull, and in those parts so well proportioned, having round about upon the head, all blew strakes, resembling hayre, downe to the Necke, (but certainly it was no haire), yet I beheld it long, and another of my company also yet living, that was not then farre from mee, saw the same comming so swiftly towards me: at which I stepped backe; for it was come within the length of a long Pike. Which when this strange Creature saw, that I went from it, it presently thereupon dived a little under water, and did swim towards the place before I landed; whereby I beheld the shoulders & back down to the middle, to be so square, white and smooth as the backe of a man; and from the middle to the hinder part, it was poynting in proportion something like a broad hooked Arrow: how it was proportioned in the forepart from the necke and shoulders, I could not well discern; but it came shortly after, to a Boat in the same Harbour (wherein one William Hawkrige then my servant was,) that hath been since a Captaine in a Ship to the East Indies, and is lately there so imployed againe by Sir Thomas Smith, in the like voyage; and the same Creature did put both his hands upon the side of the Boat, and did strive much to come in to him, and divers then in the same Boat; whereat they were afraid, and one of them strucke it a full blow on the head, whereby it fell off from them: and afterwards it came to two other Boates in the said Harbour, where they lay by the shore: the men in them, for feare fled to land. This (I suppose) was a Marmaid.

Now because divers have writ much of Maremaids, I have presumed to relate what is most certaine, of such a strange Creature that was thus then seene at New-found-land, whether it were a Maremaid or no, I know not; I leave it for others to judge, &c."

On November 13, 1812, Venant St. Germain swore a deposition regarding an animal he had seen in Lake Superior on May 3, 1782, as he was traveling to Michilimackinac and had set up camp for the night on the south end of Isle Pate, or Pie Island. Wyman (1969) reprinted this deposition from the September 1942 issue of Canada's National History Society journal, *The Beaver*. St. Germain described his encounter with the animal—

"That a little before sunset, the evening being clear and serene, deponent was returning from setting his nets, and reached his encampment a short time after the sun went down. That on disembarking, the deponent happened to turn towards the lake, when he observed, about an acre or three quarters of an acre distant from the bank where he stood, an animal in the water, which appeared to him to have the upper part of its body, above the waist, formed exactly like that of a human being. It had the half of its body out of the water, and the novelty of so extraordinary a spectacle excited his attention, and led him to examine it carefully. That the body of the animal seemed to him about the size of that of a child of seven or eight years of age, with one of its arms extended and elevated in the air. The hand appeared to be composed of fingers exactly similar to those of a man; and the right arm was kept in an elevated position, while the left seemed to rest upon the hip, but the deponent did not see the latter, it being kept under the water. The deponent distinctly saw the features of the countenance, which bore an exact resemblance to those of the human face. The eyes were extremely brilliant; the nose small but hand-

somely shaped; the mouth proportionate to the rest of the face; the complexion of a brownish hue, somewhat similar to that of a young negro; the ears well formed, and corresponding to the other parts of the figure. He did not discover that the animal had any hair, but in the place of it he observed that woolly substance about an inch long, on top of the head, somewhat similar to that which grows on the heads of negroes. The animal looked the deponent in the face, with an aspect indicating uneasiness, but at the same time with mixture of curiosity. and the deponent, along with three other men who were with him at the time, and an old Indian woman to whom he had given a passage in his canoe, attentively examined the animal for the space of three or four minutes."

St. Germain attempted to get his gun and shoot the creature, but the Native woman restrained him, saying that it was "God of the Water and Lakes" and would destroy them with a storm if they tried to harm it. He continued his statement—

"That it is in the knowledge of the deponent, that there exists a general belief diffused among the Indians who inhabit the country around this island, that it is the residence of the God of the Waters and of the Lakes, whom in their language they call Manitou Niba Nabais, and that he had often heard that this belief was peculiar to the Sauteux (Chippewa) Indians. He farther learned from another voyageur, that an animal exactly similar to that which deponent described, had been seen by him on another occasion when passing from Pate to Tonnerre, and the deponent thinks the frequent appearance of this extraordinary animal in this spot has given rise to the superstitious belief among the Indians, that the God of the Waters had fixed upon this for his residence."

The next sighting (Lewis 1820) comes from a ship sailing from New York to France. While this sighting has been proposed as being closer to Europe, the position given does not specify longitudinal coordinates. The ship traveled near the Maritimes early in its voyage, and I suspect the sighting occurred during that time.

"Extract from the log book of the ship *Leonidas*, sailing from New-York towards Havre, Asa Swift master; May 1817. Lat 44°, 6' north.

"First part of the day light variable winds and cloudy; at two P.M. on the larboard quarter, at the distance of about half the ship's length, saw a strange fish. Its lower parts were like a fish; its belly was all white; the top of the back brown, and there was the appearance of short hair as far as the top of the head. From the breast upwards, it had a near resemblance to a human being and looked upon the observers very earnestly; as it was but a short distance from the ship, all the afternoon, we had a good opportunity to observe its motions and shape. No one on board ever saw the like fish, before; all believe it to be a Mermaid.

"The second mate Mr. Stevens, an intelligent young man, told me the face was nearly white, and exactly like that of a human person; that its arms were about half as long as his, with hands resembling his own; that it stood erect out of the water about two feet, looking at the ship and sails with great earnestness. It would remain in this attitude, close along side, ten or fifteen minutes at a time, and then dive and appear on the other side. It remained around them about six hours. Mr. Stevens also stated that its hair was black on the head and exactly resembled a man's; that below the arms, it was a perfect fish in form, and that the whole length from the head to the tail about five feet."

"Communicated by Mr. Elisha Lewis of New-Haven, a respectable merchant."

Gary Mangiacopra supplied another report from Nova Scotia (Anonymous 1886):

"The Nova Scotia Mermaid

"The fisherman of Gabarus have been excited over the appearance of a mermaid seen in the waters by some fisherman a few days ago. While Mr. Bagnell, accompanied by several fishermen, was out in a boat, they observed floating on the surface of the water a few yards from the boat what they supposed to be a corpse. Approaching it for the purpose of taking it ashore for burial, they observed it to move, when, to their surprise, it turned around in a sitting position and looked at them and disappeared. A few moments after it appeared at the surface and again looked toward them, after which it disappeared altogether. The face, head, shoulders and arms resembled those of a human being, but the lower extremities had the appearance of a fish. The back of its head was covered with long, dark hair resembling a horse's mane. The arms were shaped exactly like a human being's, except that the fingers on the hands were very long. The color of the skin was not unlike that of a human being. There is no doubt that the mysterious stranger is what is known as a mermaid and the first ever seen in Cape Breton waters.—North Sydney (N.S.) Herald."

Kelland (1986) provided the most recent sightings of primate-like marine denizens of the Maritime provinces. Kelland's grandmother told him about an incident from the mid- to late 1800s. A desperate fisherman had rowed up the Grand Bank Gut in his dory, collapsing as he reached the beach. A group of men helped him home and he was medicated and put to bed for the shock and strain. The next morning, the fisherman explained the panic. While baiting for codfish with his line, he found himself struggling with a huge creature. Thinking it was a large fish, he fought

it to the surface, only to be surprised by a man-like creature. It had "eyes, a nose, a mouth and two large ears. He had arms and hands similar to ours. The only thing different I could see, being the fingers, which were webbed. Of course I couldn't see if he had any legs and feet, because the rest of him was underwater. His features on a round head looked like pictures I've seen of apes and monkeys and his face and body was covered with greyish coloured hair. But what gave me the real chillin' fright was when the creature started to mumble some kind of gibberish." The fisherman quickly pulled a knife and cut the line, letting the creature slip back into the water and disappear.

Of much more recent occurrence was the sighting by two brothers who were duck hunting in Bonavista Bay in August, 1971. Kelland's (1986) interview is one of the more interesting I have seen. Both brothers were experienced hunters, one in his mid-twenties and the other in his early thirties. They were about three miles past Cabot Island when they noticed fog coming in. They weren't able to make it to land before becoming entrenched in the fog, and lost their way back past Cabot Island. As they came up on a small island, they decided to land and make camp rather than try to reach the mainland. The island had a twelve-foot high cliff along it, with large boulders piled from the base to the shore. Looking up, one brother noticed a couple of strange creatures standing on their hind legs at the top of the cliff. The brothers were amazed, and started the motor up to try and back off, causing the creatures to move off, descend the cliff face, and then dive into the water. The frightened brothers moved off while they could, and stayed up the whole night, guns ready, in case the creatures should try to board their boat. In the morning they were able to head home, never seeing the creatures again.

The brothers described the creatures to Kelland as about "four and a half feet tall and very broad across the shoulders. The way Charlie put it, it would be just as easy to jump over them as walk around them, because they were that wide. Their arms and legs were short, and their heads appeared to be round. At that distance, one hundred feet, the men could not make out either nose nor eyes, but they could observe ears, shaped like human ears only much larger and those stuck out from the sides of their necks.

The bodies seemed to be covered with greyish coloured hair or fur. They had no distinct neck. What could be classed as a neck sloped right out and joined the shoulders. While they were watching, Charlie and David asserted the creatures never uttered a sound, no bark, no grunt, nor squeal" (Kelland 1986). Kelland asked if they could have mistaken seals, prompting strong denial. Both men were familiar with the species of seals in their region, and were certain that no seals had climbed up that twelve-foot cliff.

This last report suggests a line of inquiry. Assume for a second that there might be a semi-aquatic primate, just as there are sea otters or seals. Would it be possible for witnesses to imagine a fish-like tail if they barely get a glimpse of its lower body? Might refraction in the water convince them that the legs narrow into a tail?

As you read through these reports, there are recurring characteristics which suggest patterns—floating behavior, facial hair, etc. These are not significantly compelling yet, but I think that there is reason to keep an eye out for other sighting reports. If nothing else, I would like to see some investigation of the various small islands that are found in Bonavista and other Maritime bays. Any purported primate need not be fully aquatic, but might also inhabit forested shoreline bogs and swamps.

The best course of action would be to solicit more sightings, to determine if anyone else has seen these creatures. No common misidentifications come to mind—seals are the only viable possibility, but would be a stretch in several cases. Deliberate hoaxes are possible, but there is often little publicity—the usual motivation. It is probable, given the known likelihood for ridicule, that the witnesses believed they saw the creatures, whatever they were.

CHAPTER TWENTY-ONE

Introduced Species and Cryptozoology

Introduced species, whether released on purpose or by accident, are candidates for several cryptids, particularly mystery felines.

- Melanistic leopards have been proposed as candidates for sightings of large black panthers in North America
- Cougars may be responsible for sightings of tan felines in Australia
- Leopards, cougars, and smaller felines may be responsible for various feline sightings from the United Kingdom.
- Transplanted tuataras have been suggested as a candidate for a Welsh lizard-like ethnoknown (Shuker 1997b).
- Larger pythons and boas are often held responsible for giant snake stories.

Released exotic pets were suspected in recent New Zealand and Maui (Hawaii) "black panther" sightings, though neither case has yet led to a capture. Tigers have been spotted roaming Central American forests, accompanied by rumors of wrecked circus trains or drug lords. Just recently, hair samples from the United Kingdom confirmed that at least one feral big cat was on the loose in that country.

Even though alternative candidates may be suggested, investigators should become familiar with the process of biological invasion and the species commonly involved. It is not surprising to find some species far outside their known geographic range, and human intervention is usually the cause. Some species are more often found as aliens than others, and should become part of your normal line-up among similar species. Don't ask me why,

but coatis, for example, have been implicated in a number of strange animal incidents around the world.

Larger introduced mammals in North America, beyond a few primates, are mostly feral domestics or sport hunting species. The exotic introductions began in Texas in the 1930s. Today, introduced exotic hoofstock in North America include axis deer, fallow deer, sika deer, sambar deer, nilgai, gemsbok, blackbuck, Himalayan tahr, ibex, European mouflon sheep, and Barbary sheep. Bird introductions began with the release of European species by home-sick colonists. Several game birds are introduced, and a few parrots have formed colonies throughout the continent. Numerous reptiles, amphibians, and fish have been introduced into North America, particularly in the warmer regions. Boas, Burmese pythons, iguanas, water monitors, and chameleons are some of the larger species.

In other parts of the world, large mammal introductions have usually been ungulates—musk ox, deer, sheep, goats. Wallabies and kangaroos were released in several regions [New Zealand, Great Britain, France, Hawaii] with mixed results. Elephants were introduced into the Andaman Islands.

Few large carnivores have been purposefully introduced. Most cases involve reintroductions of extirpated species (*e.g.*, wolves in Yellowstone, bears in Europe, lynx in North America and Europe). Smaller carnivore introductions are usually for hunting or trapping—raccoons in Europe, red foxes in Tasmania and Sardinia, Arctic foxes in the Alaskan Pribolof Islands. I queried invasion biologists to determine whether cases with larger species are known. One biologist in India noted that were a couple of lions of unknown origin wandering “near Madanapalle in Chittor District in Andhra pradesh.” Another stated that a few leopards were introduced into the Andaman Islands around 1945 to check the introduced population of spotted deer, but the cats disappeared quickly.

The Invasion Process

The process of invasion requires favorable circumstances at several points, but even an unsuccessful invasion can have devastating consequences—organisms are islands harboring bacteria,

viruses, and parasites which may spread to native species. A well-adjusted ecosystem contains checks and balances for native species: diseases, competition with other species, and predation. A successfully introduced exotic bypasses these checks, and is often able to spread much more quickly than in its home range.

The invasion process begins with the arrival of the organism to the site of introduction. Most introduced species are small invertebrates or plants which stow away in agricultural or commercial shipments. Vertebrates are usually brought in through the pet trade, for academic research, exhibition, or for hunting or fishing purposes. In most cases, there is an *attractiveness* which initiates this stage. In the pet trade, for example, hobbyists often look for large, colorful animals, so there is a better chance for a species with those characteristics to be imported than an animal that is small and drab. For academic research, the attractiveness could be a particular function of its physiology.

The *introduction* is the successful release of the organism at the introduction site. The introduction stage can end with the organism being released into an unfavorable environment where it is incapable of long-term survival. The opportunity to advance to the next stage is not guaranteed by a favorable environment, however. A single male animal, for example, is not going to establish a population. In that case, the introduced animals are termed *waifs*, *casuals*, or *accidentals*.

Establishment occurs when a species successfully creates a self-sustaining and reproducing population at the site of introduction. It is at this stage that a species becomes a true concern to wildlife management. Some established populations will not be able to sustain themselves over a long period of time. *Boom-and-bust* invasions quickly achieve a peak population density, but suddenly decline for no apparent reason, until the population becomes extinct (Williamson & Fritter 1996).

Integration occurs when the species forges ecological links with other species in the region of introduction, allowing selective changes to occur which bring the new species closer to an ecological equilibrium with its physical environment. The changes occur both in the introduced species and in other species which, through competition, predation, or other factors, are influenced

by the introduced species. Carroll and Dingle (1996) noted the possibility of substantial rapid changes through *bottlenecking*, as "small populations of invading organisms may carry only a fraction of the genetic diversity of their source populations." The genetic potential is within a much smaller subset of traits than is found in the original population, which alters the availability of open variational pathways.

A final stage, *expansion*, occurs when the range of the established population expands outside of the site of introduction. Technically, this is not the same as a species being introduced from a donor region to separate introduction sites. Rather, the expansion occurs directly from the initial introduction site. Some species are not capable of expanding their ranges outside of a specific introduction site, while others do so easily.

These stages are not simple barriers for an invading species. A variety of climatic, tectonic, ecological, or man-made conditions can effectively impede the invasion process. It has been estimated that each attempt to broach one of these stages has only a 10% chance of success. For each jump to a higher stage in the invasion process, different physiological and behavioral characteristics are required. These appear to be intrinsic characters, an idea supported by the fact that some species are consistently successful invaders while closely related species are consistently unsuccessful invaders (Ehrlich 1989). These characters include having a large native range (usually on a continent), abundance within that native range, vagility, broad diets, short generation times, high genetic variability, association with humans and disturbed areas, ability to function in a wide range of physical conditions, and past invasion success.

There is no special combination of these characters which guarantees successful introductions. The characters must be available at the right time [release] and at the right place [introduction site]. Lodge (1993) noted that "it is increasingly recognized that the characteristics of the target community are as important to the fate and impact of an introduction as the characteristics of the introduced species." These environmental characters are varied, but include:

Disturbance—While disturbance has long been recognized as a factor in introductions, Fox and Fox (1986) went so far as to state that "there is no invasion of natural communities without disturbance. Where there has been successful invasion of natural communities by introduced species we contend that there has been subtle alteration of endogenous disturbance regimes." Disturbance can create or diminish a natural resource (food or water), create new microclimates, and create new competition or predation relationships with other species.

Similarity of the physical environment between the source and target areas—This is an obvious but important characteristic. Climate, plant community structure, hydric activity, and geology all must be compatible with the physiological tolerances of the invading organism. The animal's ability to adjust to a new introduction site strongly conform to the selective parameters of its prior adaptation.

Saturation of communities—Species are most likely to colonize less biologically sophisticated communities, where there is less ecological adaptation to multiple predators and competitors. They are also less likely to colonize areas where a related species of similar size or with similar habits already exists.

With numerous factors coming into play when an animal is introduced into a novel region, it is no wonder that so many invasions fail. Lodge (1993) observed that while the two primary reasons for invasion failure are inappropriate climate and predation, it is more difficult to measure the effects of competition, disease, and other factors, so those reasons should not be discounted out-of-hand. The number of individuals that initially colonize an area does not appear to be a strong factor in whether the invasion succeeds.

North American "Black Panthers" as Invasives

There are a few theories in cryptozoology regarding North American black panthers. The first is that the responsible cats are native known species with melanistic tendencies. The jaguar, for example, had a much larger range in North America in the past, and there have been suggestions from anthropologists that it may not have been extirpated as early as previously thought (Daggett and Henning 1974). There does seem to be an association between North American fossil jaguars and caves, making the Appalachian reports particularly interesting. Melanism is a dominant trait in jaguars, so the quick spread of that mutation through a population would not be biologically surprising. Jaguarundis are suspected by some to be responsible for smaller panther sightings in the southeast.

Others speculate that the animals are melanistic leopards which have been introduced at some point in time. Leopards, along with tigers, lions, jaguars, and other exotic felines, have been popular exhibit animals since the early 1700s (Benes 1995). Most early imports probably died from poor husbandry or neglect, but the possibility of escape is not unlikely. Still, that would hardly account for actual populations.

Might an early group of sport hunters have imported a feline challenge for Ozark or Appalachian hunting? It would not necessarily have had to have been just melanistic leopards. If animals were imported from European zoos, they could have been heterozygous for melanism. After establishment, genetic drift and inbreeding could create a melanistic population.

How many individuals would be necessary in a population to prevent inbreeding depression? Bailey (1993) related that the "minimum genetically effective population size" is fifty individuals, while five hundred individuals would be needed for healthy genetic adaptation. He noted that "an actual population of at least eighty to one hundred leopards" would be necessary to maintain the minimum genetically effective population (due to disease and mortality) in several parts of Africa, and that would probably be true for North America as well.

The most evident problems with this scenario are biogeographical. Would we be considering one large population spread

over a wide range, or isolated regional populations (e.g., a Pennsylvania-West Virginia population, a Georgia-Arkansas-Carolinas population) with limited genetic flow? How large would a founding group have to be to establish a genetically viable population? How fast could a population spread? Are there appropriate pathways for expansion to new regions? Beyond habitat and feeding behavior, what other adaptations would be necessary?

An introduced leopard population is just one speculative theory for North American black cat reports. What is most important is not a given theory (anyone can, and usually will, propose a candidate), but how such speculation might be used to acquire confirmative evidence. A leopard-based theory suggests a different approach than a jaguar-based theory—truthfully, a multiple model approach would be best if feasible.

The two most likely species for successful large feline introductions around the world are the leopard and cougar. Both species occupy wide natural ranges with diverse habitat and environmental conditions. Both adjust to human encroachment, often without being detected. Their invasive success is indeterminable without hard data, but they have characteristics which suggest invasive potential. This potential should always be considered when investigating reports of mystery “panthers” around the world.

APPENDIX I

Suggestions for the Obtaining of Larger Zoological Specimens for Scientific Study

Ivan T. Sanderson

The following are merely suggestions as to how larger animals may be obtained for scientific study, based on some years of field work on behalf of leading museums and zoos, and information accumulated over many years on hunting and collecting methods employed by others since prehistoric times up to the present day.

The following notes are concerned almost exclusively with forested areas, and primarily with the taller closed-canopy forests both of the equatorial and subtropical regions, and the temperate and subarctic. Quite different methods are normally employed in orchardbush and parklands, savannas and prairies, and on scrublands and hot and cold deserts. These are noted in passing just in case any such country occurs within the forested areas being investigated.

Mountain forests are somewhat different to lowland forests in that, whether they be multi-tiered or not, the former almost always have a thick undergrowth at ground level, while the latter may often be almost clear below and in such cases as the valleys in the Oregon Coastal Ranges be true Gallery Forests with no foliage

[Note—This article was provided by veteran researcher Gary Mangiacopra. It is from an early 1960s brochure, with no copyright renewal. Somewhat dated, it is still a useful commentary on the rigors of hunting large cryptids, and can be modified for present-day use or even non-hunting expeditions.]

at all between a very short ground cover and the first branches some fifty feet up. Higher Montane or Mist Forests present other special problems.

Organization

Before proceeding to discuss the actual collecting techniques, a few words are necessary on the general subject of overall organization. Too often, amateurs attempt collecting enterprises along the lines of "hunting trips." This is disastrous, for continuity is impossible, some half the time is taken up with the bare procedures of living, and if a specimen be obtained it cannot be properly preserved. In fact, without proper and specialized organization any effort is worthless in this field; and, willy-nilly, the enterprise becomes what is commonly, though often somewhat euphemistically, an "expedition." This is itself a specialized activity.

Note: Aside from any other considerations, no expedition should ever consist of less than three people; and no party in the field should ever be less than three. The significance of this will appear later, but it implies that there will have to be some doubling up of major duties as outlined below if the whole initial party is less than seven.

Departments. It does not matter how you figure it, or how you try to cut corners, the following departments have to be taken care of; and each requires careful planning, the preparation of lists of desiderata down to the last smallest item, budgeting, and, in the case of Nos. 2 to 6, most careful selection at time of purchase; classification; and very special packing. More even than a golden rule, in fact an essential, is that these departments be kept absolutely separate at all times. Further, the same numbers 2 to 6, call for two separate sets of lists. These are:

- (1) Equipment — that must at all times be in working order.
- (2) Supplies — that are expendable and must be restocked.

Actually, the officer in charge of each dept., even if doubling up, should check his supply lists every day, for items can run

away from one in special circumstances, and obtaining fresh stocks may take varying lengths of time, so that reorders have to be placed at the earliest, and the requests sent on their way to the source of supply.

(1) Finance. This should be in sole charge of the leader of the expedition, who alone should be able to draw on and disburse monies. However, powers of attorney should be signed before leaving for the field with at least two deputies, so that they may obtain funds should anything happen to the leader. Considerable cash, in small change, local currency, should always be carried. A set of books should be kept, and a daily record of expenditure balanced at least once a week against petty cash. There should be an audit after the work is over.

(2) Transport. After the means of transport have been mutually agreed upon by the expedition personnel and the sponsors, the entire implementation throughout the trip should be assigned to one officer, and he be made responsible for it. The whole enterprise depends on your transport, and there just cannot be breakdowns (which there will be) that cannot be fixed, or for which alternatives have not been provided.

(3) Commissariat. This includes also what is commonly called on an expedition "household," being housing, bedding, lighting, as well as food and the means to prepare it. Once in the field, this really becomes the most important not only because good regular meals are needed, and dry camping conditions maintained, but simply because a great deal of time, and at the most important times of the day, are otherwise wasted by the collectors. In fact, there should always be a paid employee to handle this department; and it alone.

(4) Collecting. (For this, see below.)

(5) Preserving. (For this, see my separate brochure No. 5.)

(6) Recording. One senior member of the initial personnel

should be assigned before going into the field as Recorder. This individual should assemble, pack, and maintain his own equipment and supplies. He may do the technical recording of the Preserving on behalf of its operatives, but his more essential work is to keep a diary, and be responsible for the investigation of the environment and everything in it other than the actual animals being collected. Also, he should handle the mail, and write all reports, even for the Leader, if he is not himself that person. Finally, he should be assigned all the writing of stories, news-releases, and other material after the expedition, and even the preparation of scientific papers if he is one of the scientists. His records must be kept separate from those of the technicians doing the Preserving.

(7) Public Relations. This is a great deal more important than is generally supposed, as it includes legal matters, official contacts, public relations, promotion, and publicity, or the suppression of same. The officer responsible need not be a member of the Field Party. The ideal is to have somebody handling this department at the nearest point where normal living conditions obtain, to act as executor of several matters such as reorders of supplies, communications, and so forth. If not, he or she may be at home. In this case the leader will have to handle all matters in the field but report in detail regularly on these matters, as separate from other reportage. The PR man should be kept as fully informed as possible of everything throughout, and as fast as possible; and should receive all reports or copies of reports regularly and every time a mail is sent out of the field.

We would stress that an Expedition can not get along without these seven separate departments of activity or without maintaining all of them with the strictest discipline and self-discipline. Records are more important than specimens; and without them the whole enterprise may at any moment collapse and become an entire waste of time. Also, without them at the end, the enterprise might just as well not have been initiated in the first place.

Collecting

Methods of obtaining wild animals, dead or alive, were initially developed in prehistoric times as we know from cave-paintings. Many of these original methods are still in use and are the most effective. However, since the introduction of firearms, and more especially and more recently that of stun-guns, odorless gases and poisons, and even more particularly of baits founded on sexual attraction, the picture has changed considerably.

There are almost endless variations to each of the methods listed below but these details need not concern us (in the case of ABSMs) except in a few cases. It is my personal opinion that in this case none of the active methods will work due to the nature of the creatures, though walking-up by tracking might work. It is also very doubtful that trapping would be effective except with spring-guns, large bear-traps, or drop-logs or spears. Netting, *per se*, would be useless and unless the nets were manned at all times; though a thrown net might be very effective in a face-to-face encounter if the operator were very skilled and experienced. I personally have my doubts about poisoning, at least without most careful baiting.

Collecting methods in the widest sense—i.e. methods of obtaining larger wild animals dead or alive—fall under two major heads and seven subheads as follows:

I. ACTIVE

- (1) Walking-up (Tracking, Drifting, Stalking, etc.)
- (2) Running-down (to Shoot, Slash, or Lasso.)
- (3) Driving (into nets, keddahs, off cliffs, into water, etc., by beaters, fire, gas or flooding.)

II. PASSIVE

- (1) Netting (previously strung nets to entangle)
- (2) Trapping (pitfall, drop-log, gin-trap, nooses, etc.)
- (3) Poisoning (by food, water, or gas.)
- (4) Baiting (i.e. "Waiting" for animals to be attracted to you by curiosity or baits, to then be shot or stunned)

I will now discuss each of these, seriatim, with special reference to (a) forested conditions, and (b) the supposed nature of ABSMs, giving some recorded examples of occurrences that are pertinent to our real problem.

It cannot, however, be overstressed at this point that we are herein concerned with the obtention of specimens for scientific examination—not with mere hunting, for sport, food, or trophies.

The two objectives are entirely different and opposed, and matters that may be highly effective in one case are useless in the other. Further, we must not forget that, in the case of ABSMs, we may more than likely be dealing with creatures that have all the phenomenal instinctual efficiency of other animals combined with what may even be a very high degree of intelligence, and common-sense of the human. Also, while they have been "warred upon" for millenia by Man, they are not customarily (or "used" to being) hunted, which provides them with even more special faculties. This needs explanation.

Behavior of wild creatures, animal and human. Much work and observation has now been done on this, and the findings turn out to be almost exactly the opposite of what had been previously supposed. It used to be supposed that all animals could be divided into two classes: The Hunted, and The Hunters; the first being herbivorous, the second carnivorous. Further, it was assumed that the first were cautious, wary, and nervous; the latter bold, self-assured, and indifferent to lesser creatures. This turns out to be utterly wrong. Lions may faint at the sight of flapping laundry, but lie down back to back with an antelope of a kind on which they customarily prey. Some of the ox tribe are bold and totally indifferent to hunters and very aggressive, while a Jaguar may bolt if you shout at it.

The really mysterious thing that has been discovered is that among both hunters and hunted there are two types of behaviors: there are those that are "used" to being hunted or attacked, and those that are not. But even more extraordinary, it now transpires that the former are often the most blasé, while the latter are almost invariably the most nervy, cautious, and flighty.

Two examples will suffice to explain this. The first, of an animal used to being hunted, was a herd of large gazelle grazing on a

savanna which were being stalked by a Cheetah. The gazelle sentinels spotted the cheetah early but went back to grazing. When the cheetah rose and made his final dash, the gazelle herd simply parted to let him through but one sickly gazelle took off in panic. The cheetah went straight for this, overtook it rapidly, killed it, and lay down to feed. The rest of the gazelle herd went back to grazing, and never even moved.

The other example is that of human behavior. There was a dwarf race of the Australoid race indigenous to the island of Tasmania. They were virtually without culture—and at such a low level that they were classed as a subspecies of humanity, and their numbers rapidly declined after the arrival of the whiteman. Then they became troublesome by raiding stock and farmsteads, and it was decided to clean them all out of a peninsula. Thousands of armed men strung out across the head of this peninsula, and walked almost shoulder to shoulder out to its tip. Not one single Tasmanian was seen. That fall there was a drought, and not less than five hundred of them came out of that peninsula looking for a hand-out. Tasmanians were not “used” to being hunted.

No more need be said of the facts but it must be stressed that ABSMs have nowhere, ever, been official “game” and so lack the “attitude of resignation” of the gazelle. They are too intelligent for the big carnivores and may possibly even have tamed them since earliest times and let them do their hunting—if they eat any meat. Thus, we’ve got a real problem here. Let us therefore examine and try to assess the value of the seven types of collecting in face of this problem:

(1) Walking-up. This is, or at least could be in part, feasible. However, the efforts of even the most experienced tracker could in our case be set at nought by the very fact that ABSMs apparently have a far better and more acute set of senses than any man, and would either just move perpetually ahead, to the side, or even follow the hunter to signal his movements. Even if the hunter smeared himself with ABSM excrement, as elephant hunters do with elephant dung, it would probably do not good in thick forest because the ABSMs coming to inspect him would keep out of sight and later out of reach for they would see him before he did them.

"Drifting," on the other hand, and after having established a camp and baited, might be worthwhile because an ABSM might try to attack you and you might get a shot.

(2) Riding-down. To all intents this is just not possible in the kinds of forests said to be inhabited by ABSMs. And in any case, why ride it down for, if you can see it, you can shoot it.

(3) Driving. Similarly, and especially in view of the Tasmanian affair, I personally consider this to be useless, unless one got a group of ABSMs clobbered on a small island and then called out the Marines. Even then, there is much evidence that most ABSMs are almost semi-aquatic, and that they can duck into water, remain a long time below, and swim very fast and far. You'd never get them to go over a cliff even with fire, and they would probably simply come straight back at you and go through your line without anybody either spotting them or getting a shot at one. They could climb any keddah even if they went into it, and they would not become entangled in nets for long. A gas attack would be something else, and might prove effective if you had a lot in a small space but I can't see the humanitarians letting one get away with this procedure.

(4) Netting. Although the great apes can be netted and seem no more able to understand the thing than any lower animal, an ABSM with higher intelligence but great strength (and no claws to become entangled in a net and so be pulled out on its struggles) would probably, by biting and pulling, work out of any net in short order. Of course, if a strung net be under observation from trees all along, and the watchers had powerful lights and guns, one might be obtained but I have a fancy that an ABSM would already know the net had been strung simply by watching the process from hiding or by its superior senses of smell, etc.

(5) Trapping. Here there are real possibilities though I do not think that it would be worthwhile trying to devise or set-up any live-trap. An in-sloping-sided pit might keep the specimen in but again it would probably know of the trap in advance by watching

or smell. Also, ABSMs don't use regular paths. Drop cages would never do because of the smell of their metal or of the men building them if of wood. On the other hand, spring-guns, large gins, or drop-logs might be effective but only if a long period of prior baiting had been indulged and the ABSMs had got used to prowling around at night to pick up said bait (which incidentally must have both the "come-on" and some desirable edible combined). Novelities such as these traps near your camp might fool the ABSMs once they had gotten used to your smells and sounds—vide: the Booby-Traps used in the war, which fooled even the most experienced infantrymen. There are some most ingenious traps, the worst of which that I know of is an automatic Bolas that is trip-fired and calculated to ensnare and stun anything.

(6) Poisoning. I lay considerable store by this. Today, there are some of the most deadly, tasteless, odorless, and apparently really undetectable chemical poisons available. But even more important, the indigenous natives of many tropical countries have scores of just as deadly vegetable poisons that simply cannot be detected by autopsy after death or by any known chemical analysis. If the Amerinds in B. C. have such, and would divulge them or supply them, real results might be obtained—but then only after Baiting. Even the most subtle poisons would be avoided by ABSMs unless they had already been "hooked" by baiting, simply because of the smell of the men putting down the bait.

(7) Baiting. This, in my opinion, is the only really sound, valid, and worthwhile procedure in the case of ABSMs. The idea is simply to overcome the creatures' natural caution (by one set of procedures) and then raise their curiosity (by another set) and finally "let them have it" when they overcome their caution and not used to browsing around. How you kill the specimen is of not import but once one shows itself in daylight or in artificial light, let him have it with everything you have available, going for the legs first to prevent its escape.

In the case of ABSMs, it seems to be, that everything is useless unless and until "baiting" in its widest sense and most technical

meaning has been put into operation. Once "baited" even some other of the approaches outlined above might become effective, but until and unless you can attract the creatures, you're sunk.

Baiting

This does not mean simply putting out bait to attract animals. It is almost a science in itself—in fact, it is a science and a very extensive and complex one (vide: a most extremely good article by one Fred Bruemmer in, of all publications, *CAVALIER* for July, 1961 entitled "Killer King of the Rat Catchers.") And do not forget that rats while almost as intelligent as men and having far better genetic instincts are still far, far behind the instinctual-intellectual abilities of an ABSM.

Professional "Baiting" entails several separate operations. These are in substance:

(1) Preparation, before entering the field. The more of these suggestions that can be followed the better and the easier it will be for all concerned, and the faster and more efficiently will the desired results be achieved. However not all of them can always (and sometimes none at all) be achieved. Yet, every point so taken care of, adds immeasurably to proven successes. I will describe the ideal, and leave it to you to do the best you can. It falls under three heads:

(i) Personnel. Nobody should "take a bath" for at least a month before going into the field. This does not mean that bathing is disallowed, but first and foremost no soap, detergent, or anything else should be used on the skin and especially on head hair. Such, remove the natural oils which protect us from funguses and other parasites, and deter blood-sucking insects from biting. (It is dirty clothes that encourage ticks, lice, fleas, bugs, etc.) A thorough physical examination should be made medically before leaving, and all medicaments should be closely sealed into a container that has been sterilized, and externally immunized by rubbing with animal grease. (Wooden boxes are preferable, with tarred-

canvas hinges). If you feel "dirty," wash with mud and/or some animal fat or pure grease. Wash teeth with tablesalt, or better, dry Bicarbonate of Soda.

(ii) Clothing. Also all personal effects. Try to eliminate all metal, artificial rubber, and artificial fabric such as nylon, dachron, etc. Anchor everything in running freshwater for at least 12 hours; then dry over a wood fire; do not "iron." Most thermoplastics are inert and odorless and may be used but leathers (especially well greased with animal fats) are always preferable. Natural rubber is ok if thoroughly soaked and all surface dye removed.

(iii) Equipment. As far as possible, eliminate all metal. That which cannot be so disposed of or for which non-metal substitutes cannot be found, should in all cases be wrapped, encased, or sealed in leather that has been well greased with animal oils. Avoid above all, all mineral oils, even kerosene. Electric battery lights, even if heavier, are better than kerosene lamps, but must be again greased and packed in animal oil-soaked wrappings. Aluminum is far better than iron, as it does not have anything like the odor even when corroded. (We once even used earthenware cooking utensils, wooden spoons, and flint knives for a trial and obtained quite noticeable results). That metal which you do take, ought to be brazed and then buried in damp earth, and finally scoured with sand.

The objective is to get rid of as much metal as possible and all mineral oils. Even belt-buckles, cigarette lighters, and other such small items can make a great difference. Machetes, guns, lamps, and so forth have to be of metal but leather coverings, wooden boxes, and animal oils in most part counter-act their odor. (Metal, apart from some native gold and copper is not known in Nature and it has a stronger odor to animals than anything else, although we cannot even detect it.)

(2) Camp Site. It may sound somewhat illogical but it has to be said that this is almost invariably in great part "instinctive"—whatever that may mean. The site must of course be as near to good water as possible but, apart from that, you have to follow your senses. Some sites just "look good," others don't; and in a

high percentage of cases of the former you will find that they look good also to animals. The invariable clue to this latter is whether there is an abundant small fauna of insects, snails, frogs, etc. If these are numerous, you may be sure that the smaller, medium-sized, and finally the larger animals will be around.

I can offer only two other suggestions anent this. The first is that the camp should be in a depression and as far as possible surrounded by high land and thus protected from all winds. Amateurs, and especially hunters and White Men in particular have a mania for "sunlight, air, a breeze, and a view." All are redundant, useless, and actually a deterrent to both Baiting and Hunting since they cloy the senses. You can sometimes hear a twig snap in a hollow when there is half a gale blowing above the surrounding hills.

Secondly, the location should be as thickly covered with foliage as possible and have as much ground-brush as possible all around. This latter can be cleared back, and then paths cut through it but all of these should have an initial "S"-Bend in them, so that animals can come up real close without being observed, and watch you.

(3) Behavior, at camp, for at least the initial two weeks should be extremely free and easy. You can make as much noise as you like, even to playing a radio or phonograph, smoke, and above all cook on wood. Don't go out of camp for the first few days and try to confine speech to talking, not either shouting or above all whispering. The last carries much farther than talking and, being of higher frequency, is more disturbing to animals.

Urinate and defecate freely and widely all around the camp on open ground; and brush teeth, and throw out slops widely (but don't use soap of any kind.) Above all, throw all table scraps and garbage (other than paper and artificial dejecta) all around and as widely as possible.

After a few days, you may start wandering off, moving very slowly (i.e. "drifting") from the camp at dawn and dusk. As far as possible refrain from chopping wood and, if you must, try and avoid hitting the bases of big trees—they ring like drums although we often cannot hear them do so. Change clothing as you want but soak them in running water, bury, and then dry over wood fires.

(4) Baiting. After about a week you may start your professional baiting as an extension to your garbage and other more personal disposal. Dot this about in obvious places, on the ground, a few feet up tree trunks, and especially on rocks alongside the stream or river. Inspect each bait casually twice day and note any footprints around where it was placed—(such areas may be cleared). Small animals will invariably take all bait in due course but if larger ones are about they will almost invariably leave tracks or other visual evidence.

At this point such devices as trip-wires, with or without set cameras attached, snooperscopes, buzzers, flashlights, and so forth may be mounted but the most extreme care must be taken in doing this. Again, it is the metal that will cause you the greatest trouble. Also, if any of these devices is "tripped" you may set yourself back to the beginning, or the quarry may leave the district altogether. Such mechanical devices can be very alarming to wild creatures: on the other hand, they may totally ignore them.

As is stressed in the article on rats attached, the most important of all baits is (or are) items that have a sexual attraction to the creatures desired. It has now been discovered that our, and animals' sense of smell is the most powerful that we have, and that "sex" is based on smell. Thus, probably the best "Attraction-bait" would be the menstrual flow of a female ABSM. The next best might be that of a woman. Candies made in Germany that incorporated the saliva, armpit secretions, and sperm or vaginal fluids of young men and girl volunteers were fed unknowingly to college students. Within hours almost all the eaters had somehow sought out the donors of these body essences and were in bed with them, though they did not know of their existence previously, and could not explain their actions. Some such "essences" should above all be obtained.

Once these attraction baits have been placed about, desirable foods should be added to them. For some extraordinary reason, there are a few items (some of them more or less inedible to us, or at least tasteless) that hardly any living creature can resist.

Among these are:

- Over-ripe melon rinds
- Fresh coconut pith

Whale-oil candle wax

Monkey-fat

Rotten bacon rubbed with fennel

Catnip

Chicken guts

The little round red West Indian bird-peppers

Why any of this should be, nobody has so far satisfactorily explained but almost all successful trapping has been achieved with one or other of these—and mostly coconut. Bananas are also apparently very attractive, especially outside the tropics.

In all cases you should break and bite into the bait yourself and then scatter the rest around as if abandoning it. This will get the animal used to your smell and may also do something else. This is very important.

The Gypsies have always trained all manner of animals by spitting in their mouths and making them swallow it. I have myself—and innumerable other animal people have also—used this method and it seems never to fail, even for or with wild and apparently intractable animals. It is my personal belief that it is an extension of the “kissing” bit in our sexual play, and the transference of chemicals from one body to another that plays such a large part in “sex” as we call it. (Do not forget that copulation is not primarily for the purpose of procreation, but for such an interchange.) The process is intraspecific as well as inter-sexual.

(5) The Kill. If and when the baiting is successful, a clean kill must be made. If this fails, all other specimens will probably take off for the hills. If, however, a specimen is killed (or stunned) instantly, it is a very curious fact that not only its mate and family may come around and hang around for a long time but that others may appear that have not been seen before, or even been in that vicinity before. It would seem, in fact, that as with Weasels and some other animals investigated, what we may call “funeral rights” are actually *de rigueur* among animals. Death rather than alarming the others, seems in a strange way to attract them, provided they are not themselves alarmed.

If the killing is messy, or an animal is wounded, you should

look out for an attack, at least from its mate. The Primates can be extremely vicious in this, and most persistent. And don't forget that Primates have brains like us and that an ABSM probably is one of us.

A Note on Guns

Among "sportsmen" and professional hunters the world over, there is a great preference for, and almost 'holy' belief in, rifles. They are most inefficient and dangerous mechanisms, and for collectors they are almost useless.

A rifle, and especially a high-powered one, fired at too close range will drive its solid bullet right through even a large animal without doing the slightest harm. (Explosive-nosed bullets are both illegal and useless because they simply blow the thing to bits, and the bigger it is, the smaller the bits.) A rifle is also unwieldy in a forest or any other confined space, and actually it is rather slow of operation, because of sighting.

A Submachine gun is very effect especially if it has a short barrel and a large carbine. With it, you can chop down the biggest target and then administer a decent Coupe de Grace.

But, the very best weapon to carry—and at all times—is a 12-Bore (or Gauge), double-barreled shotgun. Repeaters, or pump-guns are, frankly, not yet sufficiently perfected to be reliable at all times in damp-forest conditions. One barrel should be highly choked.

The Cartridges carried should have an extra-heavy charge of smokeless (not Black) powder, and contain ball-shot. This is the largest size lead balls that can be fitted into a standard 12-bore cartridge. With an extra-heavy charge, only about three can be so fitted. This carries a terrific hitting power, and will bowl over a charging buffalo and blow the front of its head in at about twenty paces. No bullet from a rifle can do this. Also it kills.

Apart from this, an automatic side-arm should be carried for protection—and this is better on the front of the left hip if you are right-handed—and a machete in a leather scabbard behind the left hip. Spare cartridges should be in the right trouser pocket.

Don't ever wear a jacket, or anything that hangs outside your belt and which may therefore snag your hands in reaching for

ammunition, side-arm, or machete. Your life depends on this. Any knapsack should be anchored to your midback so that it cannot possibly slew around whatever movement you make. It should contain matches, knife, a small lens, plastic tubes, and first-aid kit.

Forest "hunting" is not like that in any other country and very often you cannot even turn around if attacked, let alone bring a gun around. You will need your sidearm and machete for in fighting and protection if attacked; though, an attack from a mere animal is really not known—it is all tripe written for thriller magazines. It is men and Humanoids that you have to look out for; and it is Humanoids or even Hominids that you will be hunting.

APPENDIX II

Description Dates for North American Terrestrial Mammals

This appendix provides some insight into the direction of zoological discovery as it advanced through North America. Description date cycles provide an objective look at the state of zoology as specimens were evaluated and published. While birds, reptiles, amphibians, and fish are not included, I suspect that description dates for those will show similar trends. These are not, of course, a complete listing of all North American species descriptions. Many early descriptions were based on poorly defined characters and later subsumed into previously described species. Pinnipeds, sirenians, and cetaceans are excluded.

A few points to note—

- Every taxonomic system is in flux, as specialists differ in their characterization of specimens as species, sub-species, or conspecifics (same species). Splitters and lumpers will not always agree which species are truly distinct. Genus names may also differ as specialists rearrange a group. This list may not reflect all current mammalogical systematics.
- Certain species groups are difficult even for specialists. The *Lepus* group of *timidus*, *arcticus*, and *othus*, for example, may only be one or two true species.
- Some species became extinct after their description.
- Description dates are not discovery dates. A species may have been ethnoknown for some time before a specialist evaluated it.
- Non-endemic species may have been first described from specimens outside of North America.

Star-nosed mole, *Condylura cristata* (Linnaeus, 1758)
 Eastern mole, *Scalopus aquaticus* (Linnaeus, 1758)
 Mountain hare, *Lepus timidus* Linnaeus, 1758
 Southern flying squirrel, *Glaucomys volans* (Linnaeus, 1758)
 Woodchuck, *Marmota monax* (Linnaeus, 1758)
 Fox squirrel, *Sciurus niger* Linnaeus, 1758
 Eastern chipmunk, *Tamias striatus* (Linnaeus, 1758)
 Porcupine, *Erethizon dorsatum* (Linnaeus, 1758)
 Arctic fox, *Alopex lagopus* (Linnaeus, 1758)
 Gray wolf, *Canis lupus* Linnaeus, 1758
 Red fox, *Vulpes vulpes* (Linnaeus, 1758)
 Raccoon, *Procyon lotor* (Linnaeus, 1758)
 Brown bear, *Ursus arctos* Linnaeus, 1758
 Short-tailed weasel, *Mustela erminea* Linnaeus, 1758
 Spotted skunk, *Spilogale putorius* (Linnaeus, 1758)
 Sea otter, *Enhydra lutris* (Linnaeus, 1758)
 Wolverine, *Gulo gulo* (Linnaeus, 1758)
 Ocelot, *Leopardus pardalis* (Linnaeus, 1758)
 Jaguar, *Panthera onca* (Linnaeus, 1758)
 Moose, *Alces alces* (Linnaeus, 1758)
 Elk, *Cervus elaphus* Linnaeus, 1758
 Caribou (Reindeer), *Rangifer tarandus* (Linnaeus, 1758)
 Bison, *Bos bison* (Linnaeus, 1758)
 Nine-banded armadillo, *Dasypus novemcinctus* Linnaeus, 1758
 Collared peccary, *Tayassu tajacu* Linnaeus, 1758

Pallas' free-tailed bat, *Molossus molossus* (Pallas, 1766)
 Muskrat, *Ondatra zibethicus* (Linnaeus, 1766)
 White-nosed coati, *Nasua narica* (Linnaeus, 1766)
 Coati, *Nasua nasua* (Linnaeus, 1766)
 Least weasel, *Mustela nivalis* Linnaeus, 1766

Mountain lion, *Puma concolor* (Linnaeus, 1771)

Polar bear, *Ursus maritimus* Phipps, 1774

Gray fox, *Urocyon cinereoargenteus* (Schreber, 1775)

Red bat, *Lasiurus borealis* (Mueller, 1776)
 Tundra vole, *Microtus oeconomus* (Pallas, 1776)
 Striped skunk, *Mephitis mephitis* (Schreber, 1776)

Snowshoe hare, *Lepus americanus* Erxleben, 1777
 Mexican ground squirrel, *Spermophilus mexicanus* (Erxleben, 1777)
 Rock squirrel, *Spermophilus variegatus* (Erxleben, 1777)

Red squirrel, *Tamiasciurus hudsonicus* (Erxleben, 1777)

Fisher, *Martes pennanti* (Erxleben, 1777)

Mink, *Mustela vison* Schreber, 1777

Badger, *Taxidea taxus* (Schreber, 1777)

River otter, *Lontra canadensis* (Schreber, 1777)

Bobcat, *Lynx rufus* (Schreber, 1777)

Northern red-backed vole, *Clethrionomys rutilus* (Pallas, 1778)

Labrador collared lemming, *Dicrostonyx hudsonius* (Pallas, 1778)

Collared lemming, *Dicrostonyx torquatus* (Pallas, 1778)

Narrow-skulled vole, *Microtus gregalis* (Pallas, 1779)

Meadow jumping mouse, *Zapus hudsonius* (Zimmermann, 1780)

Black bear, *Ursus americanus* Pallas, 1780

White-tailed deer, *Odocoileus virginianus* (Zimmermann, 1780)

Muskox, *Ovibos moschatus* (Zimmermann, 1780)

Nutria, *Myocastor coypus* (Molina, 1782)

Gray squirrel, *Sciurus carolinensis* Gmelin, 1788

Opossum, *Didelphis virginiana* Kerr, 1792

Arctic shrew, *Sorex arcticus* Kerr, 1792

Masked shrew, *Sorex cinereus* Kerr, 1792

Lynx, *Lynx canadensis* Kerr, 1792

Big brown bat, *Eptesicus fuscus* (Palisot de Beauvois, 1796)

Hoary bat, *Lasiurus cinereus* (Palisot de Beauvois, 1796)

Plains pocket gopher, *Geomys bursarius* (Shaw, 1800)

Northern flying squirrel, *Glaucomys sabrinus* (Shaw, 1801)

Bighorn sheep, *Ovis canadensis* Shaw, 1804

Pine marten, *Martes americana* (Turton, 1806)

Jaguarundi, *Herpailurus yaguarondi* (Lacepede, 1809)

Black-tailed prairie dog, *Cynomys ludovicianus* (Ord, 1815)

Columbian ground squirrel, *Spermophilus columbianus* (Ord, 1815)

Meadow vole, *Microtus pennsylvanicus* (Ord, 1815)

Yellow-cheeked vole, *Microtus xanthognathus* (Leach, 1815)

Bushy-tailed woodrat, *Neotoma cinerea* (Ord, 1815)

Pronghorn, *Antilocapra americana* Ord, 1815

Mountain goat, *Oreamnos americanus* (Blainville, 1816)

Mountain beaver, *Aplodontia rufa* (Rafinesque, 1817)

Southeastern pocket gopher, *Geomys pinetis* Rafinesque, 1817

Mule deer, *Odocoileus hemionus* (Rafinesque, 1817)

Evening bat, *Nycticeius humeralis* (Rafinesque, 1818)

Western gray squirrel, *Sciurus griseus* Ord, 1818

Eastern woodrat, *Neotoma floridana* (Ord, 1818)

White-footed mouse, *Peromyscus leucopus* (Rafinesque, 1818)

Arctic hare, *Lepus arcticus* Ross, 1819

Beaver, *Castor canadensis* Kuhl, 1820

Western mastiff bat, *Eumops perotis* (Schinz, 1821)

Thirteen-lined ground squirrel, *Spermophilus tridecemlineatus*
(Mitchill, 1821)

Margay, *Leopardus wiedii* (Schinz, 1821)

Franklin's ground squirrel, *Spermophilus franklinii* (Sabine, 1822)

Richardson's ground squirrel, *Spermophilus richardsonii*
(Sabine, 1822)

Northern short-tailed shrew, *Blarina brevicauda* (Say, 1823)

Least shrew, *Cryptotis parva* (Say, 1823)

Hairy-legged vampire bat, *Diphylla ecaudata* Spix, 1823

Golden-mantled ground squirrel, *Spermophilus lateralis* (Say, 1823)

Colorado chipmunk, *Tamias quadrivittatus* (Say, 1823)

Greenland collared lemming, *Dicrostonyx groenlandicus*
(Traill, 1823)

Coyote, *Canis latrans* Say, 1823

Swift fox, *Vulpes velox* (Say, 1823)

Mexican freetail bat, *Tadarida brasiliensis*

(I. Geoffroy Saint-Hilaire, 1824)

Arctic ground squirrel, *Spermophilus parryi* (Richardson, 1825)

Lemming, *Lemmus trimucronatus* (Richardson, 1825)

Hispid cotton rat, *Sigmodon hispidus* Say and Ord, 1825

Western red bat, *Lasiurus blossevillei* (Lesson & Garnot, 1826)

- Eastern big-eared bat, *Corynorhinus rafinesquii* (Lesson, 1827)
- Northern water shrew, *Sorex palustris* Richardson, 1828
- Northern pocket gopher, *Thomomys talpoides* (Richardson, 1828)
- Northern bog lemming, *Synaptomys borealis* (Richardson, 1828)
- Pika, *Ochotona princeps* (Richardson, 1828)
- Hoary marmot, *Marmota caligata* (Eschscholtz, 1829)
- Mexican gray squirrel, *Sciurus aureogaster* F. Cuvier, 1829
- California ground squirrel, *Spermophilus beecheyi*
(Richardson, 1829)
- Giant pocket gopher, *Thomomys bulbivorus* (Richardson, 1829)
- Pygmy pocket gopher, *Thomomys umbrinus* (Richardson, 1829)
- White-sided jack rabbit, *Lepus callotis* Wagler, 1830
- Southern red-backed vole, *Clethrionomys gapperi* (Vigors, 1830)
- Pine vole, *Microtus pinetorum* (LeConte, 1830)
- Ringtail, *Bassariscus astutus* (Lichtenstein, 1830)
- Silver-haired bat, *Lasionycteris noctivagans* (LeConte, 1831)
- Little brown bat, *Myotis lucifugus* (LeConte, 1831)
- Long-tailed weasel, *Mustela frenata* Lichtenstein, 1831
- Eastern pipistrelle, *Pipistrellus subflavus* (F. Cuvier, 1832)
- Eastern hognose skunk, *Conepatus leuconotus* (Lichtenstein, 1832)
- Hognose skunk, *Conepatus mesoleucus* (Lichtenstein, 1832)
- Hooded skunk, *Mephitis macroura* Lichtenstein, 1832
- Golden mouse, *Ochrotomys nuttalli* (Harlan, 1832)
- Spotted ground squirrel, *Spermophilus spilosoma* Bennett, 1833
- Valley pocket gopher, *Thomomys bottae* (Eydoux and Gervais, 1836)
- Southern short-tailed shrew, *Blarina carolinensis* (Bachman, 1837)
- Southeastern shrew, *Sorex longirostris* Bachman, 1837
- Western big-eared bat, *Corynorhinus townsendii* (Cooper, 1837)
- Black-tailed jack rabbit, *Lepus californicus* Gray, 1837
- Swamp rabbit, *Sylvilagus aquaticus* (Bachman, 1837)
- Nuttall's cottontail, *Sylvilagus nuttallii* (Bachman, 1837)
- Marsh rabbit, *Sylvilagus palustris* (Bachman, 1837)
- Marsh rice rat, *Oryzomys palustris* (Harlan, 1837)
- Townsend's mole, *Scapanus townsendii* (Bachman, 1839)
- Big freetail bat, *Nyctinomops macrotis* (Gray, 1839)
- White-tailed jack rabbit, *Lepus townsendii* (Bachman, 1839)

- Brush rabbit, *Sylvilagus bachmani* (Waterhouse, 1839)
 Townsend's ground squirrel, *Spermophilus townsendii*
 Bachman, 1839
 Least chipmunk, *Tamias minimus* Bachman, 1839
 Townsend's chipmunk, *Tamias townsendii* Bachman, 1839
 Douglas' squirrel, *Tamiasciurus douglasii* (Bachman, 1839)
 Townsend pocket gopher, *Thomomys townsendi* (Bachman, 1839)
 Wyoming pocket mouse, *Perognathus fasciatus*
 Wied-Neuweid, 1839
 Creeping vole, *Microtus oregoni* (Bachman, 1839)
 Townsend's vole, *Microtus townsendii* (Bachman, 1839)
- Yellow-bellied marmot, *Marmota flaviventris*
 (Audubon and Bachman, 1841)
 Northern grasshopper mouse, *Onychomys leucogaster* (Wied, 1841)
 Eastern harvest mouse, *Reithrodontomys humulis*
 (Audubon and Bachman, 1841)
- Hairy-tailed mole, *Parascalops breweri* (Bachman, 1842)
 Broad-footed mole, *Scapanus latimanus* (Bachman, 1842)
 California myotis, *Myotis californicus*
 (Audubon and Bachman, 1842)
 Small-footed myotis, *Myotis leibii* (Audubon and Bachman, 1842)
 Prairie vole, *Microtus ochrogaster* (Wagner, 1842)
 Water vole, *Microtus richardsoni* (De Kay, 1842)
- Waterhouse's leaf-nosed bat, *Macrotus waterhousii* Gray, 1843
 Wagner's mastiff bat, *Eumops glaucinus* (Wagner, 1843)
 Oldfield mouse, *Peromyscus polionotus* (Wagner, 1843)
- Hognose bat, *Choeronycteris mexicana* Tschudi, 1844
- Deer mouse, *Peromyscus maniculatus* (Wagner, 1845)
- Pacific kangaroo rat, *Dipodomys agilis* Gambel, 1848
 Great Basin pocket mouse, *Perognathus parvus* (Peale, 1848)
 California vole, *Microtus californicus* (Peale, 1848)
 Montane vole, *Microtus montanus* (Peale, 1848)
 California mouse, *Peromyscus californicus* (Gambel, 1848)
 Red wolf, *Canis rufus* Audubon and Bachman, 1851
 Black-footed ferret, *Mustela nigripes*
 (Audubon and Bachman, 1851)
- Desert Pocket Mouse, *Chaetodipus penicillatus* (Woodhouse, 1852)

Yellow-faced pocket gopher, *Pappogeomys castanops* (Baird, 1852)

Abert's squirrel, *Sciurus aberti* Woodhouse, 1853

Heermann's kangaroo rat, *Dipodomys heermanni* LeConte, 1853

Ord's kangaroo rat, *Dipodomys ordi* Woodhouse, 1853

Cotton mouse, *Peromyscus gossypinus* (LeConte, 1853)

Yuma antelope squirrel, *Ammospermophilus harrisii*

(Audubon and Bachman, 1854)

Gunnison's prairie dog, *Cynomys gunnisoni* (Baird, 1855)

Cliff chipmunk, *Tamias dorsalis* Baird, 1855

Baird's pocket gopher, *Geomys breviceps* Baird, 1855

Silky pocket mouse, *Perognathus flavus* Baird, 1855

Mexican woodrat, *Neotoma mexicana* Baird, 1855

Southern plains woodrat, *Neotoma micropus* Baird, 1855

Brush mouse, *Peromyscus boylii* (Baird, 1855)

Plains harvest mouse, *Reithrodontomys montanus* (Baird, 1855)

Pallid bat, *Antrozous pallidus* (LeConte, 1856)

Southern yellow bat, *Lasiurus ega* (Gervais, 1856)

Hayden's shrew, *Sorex haydeni* Baird, 1857

Trowbridge's shrew, *Sorex trowbridgii* Baird, 1857

Vagrant shrew, *Sorex vagrans* Baird, 1857

Pygmy shrew, *Sorex hoyi* Baird, 1857

American shrew-mole, *Neurotrichus gibbsii* (Baird, 1857)

Leafnose bat, *Macrotus californicus* Baird, 1857

Desert cottontail, *Sylvilagus audubonii* (Baird, 1857)

Beach vole, *Microtus breweri* (Baird, 1857)

Appalachian woodrat, *Neotoma magister* Baird, 1857

Bog lemming, *Synaptomys cooperi* Baird, 1857

Channel Islands gray fox, *Urocyon littoralis* (Baird, 1857)

Round-tailed ground squirrel, *Spermophilus tereticaudus*
Baird, 1858

Dusky-footed woodrat, *Neotoma fuscipes* Baird, 1858

Cactus mouse, *Peromyscus eremicus* (Baird, 1858)

Western harvest mouse, *Reithrodontomys megalotis* (Baird, 1858)

Hispid Pocket Mouse, *Chaetodipus hispidus* (Baird, 1858)

Big long-nosed bat, *Leptonycteris nivalis* (Saussure, 1860)

Mexican vole, *Microtus mexicanus* (Saussure, 1861)

Northern yellow bat, *Lasiurus intermedius* H. Allen, 1862

Uinta ground squirrel, *Spermophilus armatus* Kennicott, 1863

Wyoming ground squirrel, *Spermophilus elegans* Kennicott, 1863

Piute ground squirrel, *Spermophilus mollis* Kennicott, 1863

Peter's ghost-faced bat, *Mormoops megalophylla* (Peters, 1864)

Long-eared myotis, *Myotis evotis* (H. Allen, 1864)

Yuma myotis, *Myotis yumanensis* (H. Allen, 1864)

Western pipistrelle, *Pipistrellus hesperus* (H. Allen, 1864)

Long-legged myotis, *Myotis volans* (H. Allen, 1866)

Arizona gray squirrel, *Sciurus arizonensis* Coues, 1867

Long-eared chipmunk, *Tamias quadrimaculatus* Gray, 1867

Mexican pocket mouse, *Liomys irroratus* (Gray, 1868)

Sagebrush vole, *Lemmiscus curtatus* (Cope, 1868)

Southern grasshopper mouse, *Onychomys torridus* (Coues, 1874)

Wyoming pocket gopher, *Thomomys clusius* Coues, 1875

Little pocket mouse, *Perognathus longimembris* (Coues, 1875)

Desert shrew, *Notiosorex crawfordi* (Coues, 1877)

Pacific shrew, *Sorex pacificus* Coues, 1877

Coues' rice rat, *Oryzomys couesi* (Alston, 1877)

Insular myotis, *Myotis insularum* (Dobson, 1878)

Pacific marsh shrew, *Sorex bendirii* (Merriam, 1884)

Florida water rat, *Neofiber alleni* True, 1884

Dall sheep, *Ovis dalli* Nelson, 1884

Pinon mouse, *Peromyscus truei* (Shufeldt, 1885)

Western small-footed myotis, *Myotis ciliolabrum* (Merriam, 1886)

Desert kangaroo rat, *Dipodomys deserti* Stephens, 1887

Northern pygmy mouse, *Baiomys taylori* (Thomas, 1887)

Belding's ground squirrel, *Spermophilus beldingi* Merriam, 1888

Long-tailed vole, *Microtus longicaudus* (Merriam, 1888)

Kit fox, *Vulpes macrotis* Merriam, 1888

Pribilof Island shrew, *Sorex hydrodromus* Dobson, 1889

Pocketed freetail bat, *Nyctinomops femorosaccus* (Merriam, 1889)
 White-tailed antelope squirrel, *Ammospermophilus leucurus*
 (Merriam, 1889)

Mohave ground squirrel, *Spermophilus mohavensis* Merriam, 1889
 Merriam's chipmunk, *Tamias merriami* J. A. Allen, 1889
 Southern Texas pocket gopher, *Geomys personatus* True, 1889
 Gulf Coast kangaroo rat, *Dipodomys compactus* True, 1889
 Plains pocket mouse, *Perognathus flavescens* Merriam, 1889
 San Joaquin pocket mouse, *Perognathus inornatus* Merriam, 1889
 Florida mouse, *Podomys floridanus* (Chapman, 1889)
 California Pocket Mouse, *Chaetodipus californicus* (Merriam, 1889)
 San Diego Pocket Mouse, *Chaetodipus fallax* (Merriam, 1889)
 Longtail Pocket Mouse, *Chaetodipus formosus* Merriam, 1889
 Rock Pocket Mouse, *Chaetodipus intermedius* (Merriam, 1889)
 Spiny Pocket Mouse, *Chaetodipus spinatus* (Merriam, 1889)
 Tundra collared lemming, *Dicrostonyx rubricatus*
 (Richardson, 1889)
 Mountain Phenacomys, *Phenacomys intermedius* Merriam, 1889
 Ungava vole, *Phenacomys ungava* Merriam, 1889
 Tawny-bellied cotton rat, *Sigmodon fulviventer* J. A. Allen, 1889

Merriam's shrew, *Sorex merriami* Dobson, 1890
 Montane shrew, *Sorex monticolus* Merriam, 1890
 Cave myotis, *Myotis velifer* (J. A. Allen, 1890)
 Red tree vole, *Arborimus longicaudus* (True, 1890)
 Antelope jack rabbit, *Lepus alleni* Mearns, 1890
 Eastern cottontail, *Sylvilagus floridanus* (J. A. Allen, 1890)
 Texas antelope squirrel, *Ammospermophilus interpres*
 (Merriam, 1890)

White-tailed prairie dog, *Cynomys leucurus* Merriam, 1890
 Nayarit squirrel, *Sciurus nayaritensis* J. A. Allen, 1890
 Yellow-pine chipmunk, *Tamias amoenus* J. A. Allen, 1890
 Gray-collared chipmunk, *Tamias cinereicollis* J. A. Allen, 1890
 California chipmunk, *Tamias obscurus* J. A. Allen, 1890
 Allen's chipmunk, *Tamias senex* J. A. Allen, 1890
 Lodgepole chipmunk, *Tamias speciosus* Merriam, 1890
 Uinta chipmunk, *Tamias umbrinus* J. A. Allen, 1890
 California kangaroo rat, *Dipodomys californicus* Merriam, 1890
 Merriam's kangaroo rat, *Dipodomys merriami* Mearns, 1890
 Bannertail kangaroo rat, *Dipodomys spectabilis* Merriam, 1890
 Western red-backed vole, *Clethrionomys californicus*
 (Merriam, 1890)

Arizona cotton rat, *Sigmodon arizonae* Mearns, 1890

Spotted bat, *Euderma maculata* (J. A. Allen, 1891)

- Dark kangaroo mouse, *Microdipodops megacephalus* Merriam, 1891
- Canyon mouse, *Peromyscus crinitus* (Merriam, 1891)
- Rock mouse, *Peromyscus difficilis* (J. A. Allen, 1891)
- Northern rock mouse, *Peromyscus nasutus* (J. A. Allen, 1891)
- Woodland jumping mouse, *Napaeozapus insignis* (Miller, 1891)
- Pygmy Rabbit, *Brachylagus idahoensis* (Merriam, 1891)
- Merriam's pocket mouse, *Perognathus merriami* J. A. Allen, 1892
- San Joaquin antelope squirrel, *Ammospermophilus nelsoni* (Merriam, 1893)
- Alpine chipmunk, *Tamias alpinus* Merriam, 1893
- Panamint chipmunk, *Tamias panamintinus* Merriam, 1893
- Sierra pocket gopher, *Thomomys monticola* J. A. Allen, 1893
- Desert woodrat, *Neotoma lepida* Thomas, 1893
- Western jumping mouse, *Zapus princeps* J. A. Allen, 1893
- Collared pika, *Ochotona collaris* (Nelson, 1893)
- Texas kangaroo rat, *Dipodomys elator* Merriam, 1894
- Fresno kangaroo rat, *Dipodomys nitratooides* Merriam, 1894
- Panamint kangaroo rat, *Dipodomys panamintinus* (Merriam, 1894)
- White-eared pocket mouse, *Perognathus alticola* Rhoads, 1894
- Yellow-nosed vole, *Microtus chrotorrhinus* (Miller, 1894)
- White-throated woodrat, *Neotoma albigula* Hartley, 1894
- Fulvous harvest mouse, *Reithrodontomys fulvescens* J. A. Allen, 1894
- Bailey Pocket Mouse, *Chaetodipus baileyi* (Merriam, 1894)
- Nelson Pocket Mouse, *Chaetodipus nelsoni* (Merriam, 1894)
- Pribilof Island lemming, *Lemmus nigripes* (True, 1894)
- Baird's shrew, *Sorex bairdii* Merriam, 1895
- Smoky shrew, *Sorex fumeus* Miller, 1895
- Dwarf shrew, *Sorex nanus* Merriam, 1895
- Ornate shrew, *Sorex ornatus* Merriam, 1895
- Inyo shrew, *Sorex tenellus* Merriam, 1895
- Pribilof shrew, *Sorex pribilofensis* Merriam 1895
- Seminole bat, *Lasiurus seminolus* (Rhoads, 1895)
- Keen's myotis, *Myotis keenii* (Merriam, 1895)
- New England cottontail, *Sylvilagus transitionalis* (Bangs, 1895)
- Cascade golden-mantled ground squirrel, *Spermophilus saturatus* (Rhoads, 1895)
- Desert pocket gopher, *Geomys arenarius* Merriam, 1895
- Attwater's pocket gopher, *Geomys attwateri* Merriam, 1895

Llano pocket gopher, *Geomys texensis* Merriam, 1895
 Texas mouse, *Peromyscus attwateri* J. A. Allen, 1895
 Pacific jumping mouse, *Zapus trinotatus* Rhoads, 1895

Coast mole, *Scapanus orarius* True, 1896
 Mearns' grasshopper mouse, *Onychomys arenicola* Mearns, 1896
 Merriam's mouse, *Peromyscus merriami* Mearns, 1896

Southeastern myotis, *Myotis austroriparius* (Rhoads, 1897)
 Western yellow bat, *Lasiurus xanthinus* (Thomas, 1897)
 Fringed myotis, *Myotis thysanodes* Miller, 1897
 Yellow-cheeked chipmunk, *Tamias ochrogenys* (Merriam, 1897)
 Palmer's chipmunk, *Tamias palmeri* (Merriam, 1897)
 Mazama pocket gopher, *Thomomys mazama* Merriam, 1897
 Gray-tailed vole, *Microtus canicaudus* Miller, 1897
 Keen's mouse, *Peromyscus keeni* Merriam, 1897
 Black-eared mouse, *Peromyscus melanotis*

J. A. Allen and Chapman, 1897

Sitka mouse, *Peromyscus sitkensis* Merriam, 1897

Olympic marmot, *Marmota olympus* (Merriam, 1898)
 Gray ground squirrel, *Spermophilus canus* Merriam, 1898
 Merriam's pinon mouse, *Peromyscus gratus* Merriam, 1898

Elliot's short-tailed shrew, *Blarina hylophaga* Elliot, 1899
 St. Matthews island vole, *Microtus abbreviatus* Miller, 1899

Lesser long-nosed bat, *Leptonycteris curasoae* Miller, 1900
 Glacier Bay water shrew, *Sorex alaskanus* Merriam, 1900
 Tundra shrew, *Sorex tundrensis* Merriam, 1900
 Beringian hare, *Lepus othus* Merriam, 1900
 Arizona pocket mouse, *Perognathus amplus* Osgood, 1900
 Nelson's collared lemming, *Dicrostonyx nelsoni* Merriam, 1900
 Richardson's collared lemming, *Dicrostonyx richardsoni*

Merriam, 1900

Aleutian Island collared lemming, *Dicrostonyx unalascensis*
 Merriam, 1900

Dawson's caribou, *Rangifer dawsoni* Seton, 1900

Idaho pocket gopher, *Thomomys idahoensis* Merriam, 1901
 Pale kangaroo mouse, *Microdipodops pallidus* Merriam, 1901
 Singing vole, *Microtus miurus* Osgood, 1901
 White-footed vole, *Arborimus albipes* (Merriam, 1901)

Mt. Lyell shrew, *Sorex lyelli* Merriam, 1902

- Gray-footed chipmunk, *Tamias canipes*(V. Bailey, 1902)
 Yellow-nosed cotton rat, *Sigmodon ochrognathus*V. Bailey, 1902
- Giant kangaroo rat, *Dipodomys ingens* (Merriam, 1904)
 Great Basin kangaroo rat, *Dipodomys microps* (Merriam, 1904)
 Dulzura kangaroo rat, *Dipodomys simulans*Merriam, 1904
 Santa Cruz kangaroo rat, *Dipodomys venustus* (Merriam, 1904)
 White-ankled mouse, *Peromyscus pectoralis*Osgood, 1904
- Davis Mountain cottontail, *Sylvilagus robustus*(Bailey, 1905)
 Utah prairie dog, *Cynomys parvidens* J. A. Allen, 1905
 Stephens' woodrat, *Neotoma stephensi*Goldman, 1905
- Stephens' kangaroo rat, *Dipodomys stephensi* (Merriam, 1907)
- Salt-marsh harvest mouse, *Reithrodontomys raviventris*
 (Dixon, 1908)
- Gray bat, *Myotis grisescens*A. H. Howell, 1909
- Long-tailed shrew, *Sorex dispar*Batchelder, 1911
 Maryland shrew, *Sorex fontinalis* Hollister, 1911
 Vancouver Island marmot, *Marmota vancouverensis*Swarth, 1911
- Mexican shrew, *Sorex mexicanus*Bailey, 1913
 New Mexico shrew, *Sorex neomexicanus*Bailey, 1913
- Sonoma chipmunk, *Tamias sonomae*(Grinnell, 1915)
- Mexican big-eared bat, *Corynorhinus mexicanus*
 (G. M. Allen, 1916)
 Allen's big-eared bat, *Idionycteris phyllotis* (G. M. Allen, 1916)
- St. Lawrence Island collared lemming, *Dicrostonyx exsul*
 G. M. Allen, 1919
- Big-eared Kangaroo Rat, *Dipodomys elephantinus* (Grinnell,1919)
- Red-tailed chipmunk, *Tamias ruficaudus*(A. H. Howell, 1920)
- Fog shrew, *Sorex sonomae*Jackson, 1921
- Preble's shrew, *Sorex preblei*Jackson, 1922
 Siskiyou chipmunk, *Tamias siskiyou*(A. H. Howell, 1922)
- Gaspe shrew, *Sorex gaspensis* Anthony and Goodwin, 1924

Arizona woodrat, *Neotoma devia* Goldman, 1927

Cinnamon myotis, *Myotis fortidens* Miller and G. M. Allen, 1928

Indiana bat, *Myotis sodalis* Miller and G. M. Allen, 1928

Idaho ground squirrel, *Spermophilus brunneus*
(A. H. Howell, 1928)

St. Lawrence island shrew, *Sorex jacksoni* Hall and Gilmore, 1932

Alaska marmot, *Marmota broweri* Hall and Gilmore, 1934

Washington ground squirrel, *Spermophilus washingtoni*
(A. H. Howell, 1938)

Underwood mastiff bat, *Eumops underwoodi* Goodwin, 1940

Santa Catalina shrew, *Sorex willetti* von Bloeker 1941

Barren ground shrew, *Sorex ugyunak* Anderson and Rand, 1945

Kilangmiutak collared lemming, *Dicrostonyx kilangmiutak*
Anderson and Rand, 1945

Southwestern myotis, *Myotis auriculus* Baker and Stains, 1955

Ogilvie collared lemming, *Dicrostonyx nunatakensis*
Youngman, 1967

Jones' pocket gopher, *Geomys knoxjonesi*
Baker and Genoways, 1975

Arizona shrew, *Sorex arizonae* Diersing and Hoffmeister, 1977

Hopi chipmunk, *Tamias rufus* (Hoffmeister and Ellis, 1979)

Sonoma tree vole, *Arborimus pomo* Johnson and George, 1991

Appalachian cottontail, *Sylvilagus obscurus*
Chapman, Cramer, Deppenaar,
& Robinson, 1992

Yukon River shrew, *Sorex yukonicus* Dokuchaev, 1997

We should not, of course, read too much into this, but there are a few reasonable observations which can be made:

- Large size was not the most important factor in determining a species' description date. The last large species include the red wolf (1851), dall sheep (1884), and the now extinct Dawson's caribou (1900). The latter species is considered a subspecies by some, but was morphologically distinctive. Even among small mammals, larger forms continued to be discovered into the 1900s.
- Species descriptions were published by a relative handful of specialists. This relates to an individual's interest and capability as much as it does to the species' availability.

APPENDIX III

Wildlife Genetics Laboratories

The following genetics laboratories offer wildlife identification services to wildlife professionals. They may or may not be willing to offer such services for cryptozoological projects. Please note that you cannot just send hair samples to a laboratory and expect them to prove that Bigfoot exists. You must be working with individuals who have the background and experience to understand what the results mean, and what the next steps must be in order to use the results as evidence for a species. Genetic evidence for a supposedly extirpated species will require different treatment than genetic evidence for a completely unknown species.

Keep in mind, as well, that extensive genetic testing can be expensive. Some laboratories may offer cheaper alternatives, so examine the offered services carefully and discuss your project with a professional biologist before making any decisions.

Wildlife Genetics International
PO Box 274
610 Railway Street
Nelson, British Columbia V1L 5P9 Canada

Website:
www.wildlifegenetics.ca

Natural Resources DNA Profiling & Forensic Centre
Biology Department
Trent University
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Peterborough, Ontario K9J 7B8 Canada

Website:
www.forensicdna.ca

Wildlife DNA Services
9th Floor, Alun Roberts Building
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Website:
www.wdnas.com

Veterinary Genetics Laboratory
Forensic DNA Testing
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Website:
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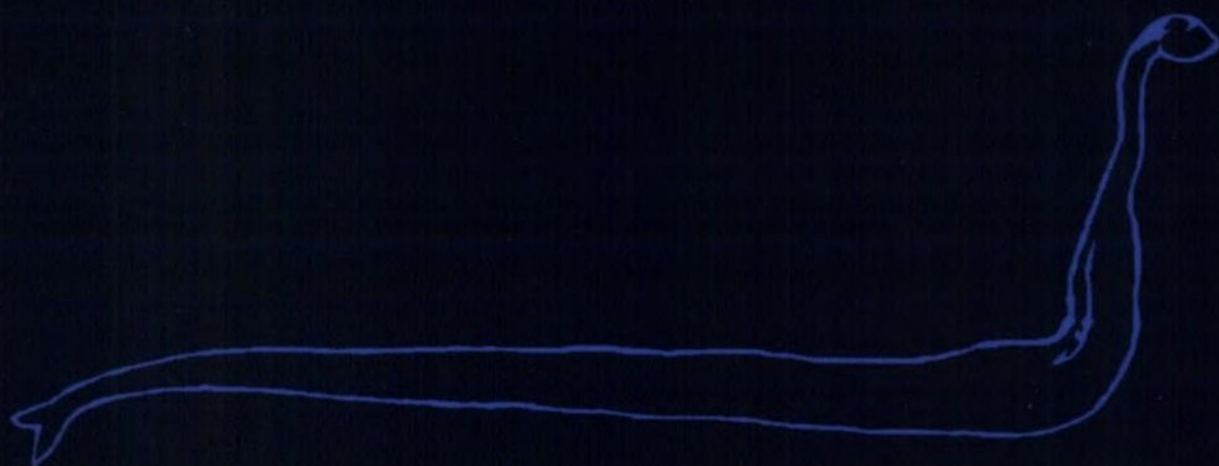
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Zoological discovery is not confined to the distant past. Biologists continue to reveal significant new species around the globe and under the ocean. Cryptozoology scrutinizes reports of puzzling creatures that do not fit nicely into the recognized scheme of described species.

Sightings of mystery animals deserve critical objective investigation without pandering to either credulous acceptance or narrow-minded dismissal. Cryptozoology provides the framework for exploration and discovery.



Witness' sketch, 1897, Queen Charlotte Islands
(Mattison 1984)

